Review of the 1982-83 British Columbia Herring Fishery and Spawn Abundance

D.D. Chalmers and V. Miller

Department of Fisheries and Oceans
Field Services Branch
3225 Stephenson Point Road
Nanaimo, British Columbia V9T 1K3

September, 1985

Canadian Industry Report of
Fisheries and Aquatic Sciences
No. 162

86-0057/

Canadian Industry Report of Fisheries and Aquatic Sciences

These reports contain the results of research and development that are useful to industry for either immediate or future application. Industry Reports are directed primarily towards individuals in the primary and secondary sectors of the fishing and marine industries. No restriction is placed on subject matter and the series reflects the board interests and policies of the Department of Fisheries and Oceans, namely, fisheries management, technology and development, ocean sciences, and aquatic environments relevent to Canada.

Industry Reports may be cited as full publications. The correct citation appears above the abstract of each report. Each report will be abstracted in *Aquatic Sciences and Fisheries Abstracts* and will be indexed annually in the Department's index to scientific and technical publications.

Numbers 1-91 in this series were issued as Project Reports of the Industrial Development Branch, Technical Reports of the Industrial Development Branch, and Technical Reports of the Fisherman's Service Branch. Numbers 92-110 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Industry Reports. The current series name was changed with report number 111.

Details on the availability of Industry Reports in hard copy may be obtained from the issuing establishment on the front cover.

Rapport canadien à l'industrie sur les sciences halieutiques et aquatiques

Ces rapports contiennent les résultats des recherches et des progrès qui peuvent être utiles à l'industrie pour des applications soit immédiates, soit futures. Ils sont préparés à l'intention principalement des membres des secteurs primaire et secondaire de l'industrie des pêches et de la mer. Il n'y a aucune restriction quant au sujet; de fait, la série reflète la vaste gamme des intérêts et des politiques du Ministère des Pêches et des Océans, notamment gestion des pêches, techniques et développement, sciences océaniques et environnements aquatiques, au Canada.

Les Rapports destinés à l'industrie peuvent être considérés comme des publications complètes. Le titre exact paraît au haut du résumé de chaque rapport, qui sera publié dans la revue *Aquatic Sciences and Fisheries Abstracts* et qui figurera dans l'index annuel des publications scientifiques et techniques du Ministère.

Les numéros de 1 à 91 de cette série ont été publiés à titre de rapports sur les travaux de la Direction du développement industriel, de rapports techniques de la Direction du développement industriel, et de rapports techniques de la Direction des services aux pêcheurs. Les numéros 92 à 110 ont été publiés à titre de Rapports à l'industrie du Service des pêches et de la mer, Ministère des Pêches et de l'Environnement. Le nom de la série a été changé à partir du rapport numéro 111.

La page couverture porte le nom de l'établissement auteur où l'on peut se procurer les rapports sous couverture cartonnée.

Canadian Industry Report of
Fisheries and Aquatic Sciences 162

September 1985

REVIEW OF THE 1982-83 BRITISH COLUMBIA HERRING FISHERY AND SPAWN ABUNDANCE

by

D.D. Chalmers and V. Miller

Department of Fisheries and Oceans
Field Services Branch
3225 Stephenson Point Road
Nanaimo, B.C. V9T 1K3

© Minister of Supply and Services Canada 1985
Cat. No. Fs 97-14/162 ISSN 0704-3694

Correct citation for this publication:

Chalmers, D.D. and V. Miller. 1985. Review of the 1982-83 British Columbia herring fishery and spawn abundance. Can. Ind. Rep. Fish. Aquat. Sci. 162: 59 p.

CONTENTS

List of Figures iv
List of Tables iv
Abstract/Résumé v
Introduction 1
Methods 1

1982 Herring food and bait fishery 2
North Coast fishery 2
South Coast fishery 4

1983 Roe herring fishery 4
Queen Charlotte Islands sub-districts (Areas 1, 2E, 2W). 8
Central Coast sub-districts (Areas 6, 7, 8, 9, 10) 9
Middle East Coast sub-districts (Areas 13, 14, 15, 16) 10
Lower East Coast sub-districts (Areas 17, 18, 19) 12
Lower West Coast Vancouver Island sub-districts (Areas 23, 24) 13
Upper West Coast Vancouver Island sub-districts (Areas 25, 26, 27). 14

1983 Spawn-on-kelp fishery 15

1983 Herring spawn summary 16
Queen Charlotte Islands sub-districts (Areas 1, 2E, 2W). 16
North Coast sub-districts (Areas 3, 4, 5) 16
Central Coast sub-districts (Areas 6, 7, 8, 9, 10) 19
Upper East Coast sub-districts (Areas 11, 12) 19
Middle East Coast sub-districts (Areas 13, 14, 15, 16) 19
Lower East Coast sub-districts (Areas 17, 18) 19
Lower West Coast Vancouver Island sub-districts (Areas 23, 24) 19
Upper West Coast Vancouver Island sub-districts (Areas 25, 26, 27) 20

Acknowledgements 44
References 44
Figures 45

LIST OF FIGURES

Figure

1. Location of Statistical Areas in northern B.C. 45
2. Location of Statistical Areas in southern B.C. 46
3. Roe herring fishing boundaries and hailed catches by gear type and Statistical Area, B.C., 1983 47
   a. Area 2E, Burnaby Strait 47
   b. Area 2E, Poole Inlet-Skincuttle Inlet 48
   c. Area 2W, Inskip Channel 49
   d. Area 6, Price Island-Milbanke Sound 50
   e. Area 7, Thompson Sound 51
   f. Area 7, Cape Mark-Thompson Bay 52
   g. Area 14, Comox-Cape Lazo 53
   h. Area 14, Hornby Island-Denman Island 54
   i. Area 15, Powell River 55
   j. Area 17, Nanoose Bay 56
   k. Area 23, Barkley Sound 57
   l. Area 25, Esperanza Inlet 58
   m. Area 27, Winter Harbour 59

LIST OF TABLES

Table

1. Herring spawn intensity categories and weighting factors used to calculate standard square meters 3
2. Conversion of layers of herring eggs to spawn intensity categories 3
3. Distribution of licensed gear by gear type and roe herring area, B.C., 1983 5
4. Anticipated roe herring catches by roe herring area, B.C., 1983 5
5. Hailed roe herring catches by gear type and roe herring area, B.C., 1983 5
6. Roe herring catches by gear type and roe herring area from preliminary sales slip data, B.C., 1983 5
7. Annual hailed roe herring catches in Area A (north of Cape Caution) by Statistical Area and gear type, B.C., 1980-1983 6
8. Annual hailed roe herring catches in Area B (Strait of Georgia) by Statistical Area and gear type, B.C., 1980-1983 6
9. Annual hailed roe herring catches in Area C (West Coast Vancouver Island) by Statistical Area and gear type, B.C., 1980-1983 7
10. Annual landed weight and value of British Columbia roe herring catches, 1979-1983 7
11. Standard square meters of herring spawn deposited in northern British Columbia by herring district and Statistical Area, 1980-1983 17
12. Standard square meters of herring spawn deposited in southern British Columbia by herring district and Statistical Area, 1980-1983 18
13. Summary of individual herring spawnings, B.C., 1983. 21

ABSTRACT

Chalmers, D.D. and V. Miller. 1985. Review of the 1982-83 British Columbia herring fishery and spawn abundance. Can. Ind. Rep. Fish. Aquat. Sci. 162: 59 p.

During the 1982-83 fishing season in British Columbia, herring were fished for food and bait from November 15 to December 10, 1982 and for roe from March 1 to 21, 1983. The total food and bait catch was 1,572 tons (1,426 mt). The total roe herring catch was 40,236 tons (36,500 mt) with a landed value of $47.9 million. There were 28 spawn-on-kelp licences issued for a total production of 248 tons (225 mt). The 15.6 million standard square meters of spawn recorded coastwide were below the 1980-82 average of 17.3 million.

Key words: Pacific herring, roe fishery, spawn-on-kelp, catch, spawn.

RÉSUMÉ

Chalmers, D.D. and V. Miller. 1985. Review of the 1982-83 British Columbia herring fishery and spawn abundance. Can. Ind. Rep. Fish. Aquat. Sci. 162: 59 p.

Au cours de la saison de pêche 1982-1983 en Colombie-Britannique, le hareng a été pêché comme nourriture et appât du 15 novembre au 10 décembre 1982 et pour la rogue du 1er au 21 mars 1983. Les prises de hareng de consommation et d'appât totalisaient 1 572 t (1 426 tm) tandis que les captures totales de hareng rogué s'élevaient à 40 236 t (36 500 tm), dont la valeur au débarquement se chiffrait à $47,9 millions. La production totale, tirée de 28 permis d'exploitation des oeufs sur varech, s'élevait à 248 t (225 tm). Sur tout le littoral, la rogue couvrait 15,6 millions de mètres carrés, soit une superficie inférieure à la moyenne de 17,3 millions observée en 1980-1982.

Mots-clés: hareng du Pacifique, pêche de la rogue, oeufs sur varech, prises, oeufs.

INTRODUCTION

Between October and December, adult Pacific herring (Clupea harengus pallasi) begin their migration inshore from offshore feeding areas in preparation for spawning during March and April. While inshore they congregate in dense schools and hold in the deeper waters of bays and inlets. During this time, they are subjected to two major commercial fisheries in the coastal waters of British Columbia: a food and bait fishery in November/December when the fat content is high and a roe herring fishery that occurs in March just prior to spawning when gonad development is at a maximum.

Once the herring have deposited their eggs, measurements of each spawning are carried out to determine escapement levels. This information along with estimates of natural mortality and recruitment provide the basis for forecasting herring abundance for the coming year (Stocker, Haist and Fournier 1983). In past years these forecasts, along with social, economic and management considerations were used to determine potential catch limits for each fishery.

Prior to any fishery, hydroacoustic estimates were made of the fish stocks, and catch limits were adjusted accordingly. This system invariably led to conflicts between Industry and the Department as well as in-season fluctuations in catch levels. In order to alleviate some of these management problems during the 1983 fishery, specific catch quotas which were not altered during the season, were assigned to each of the fishing areas.

The present report is one of a series of publications by the Department of Fisheries and Oceans (DFO) aimed at providing the annual summary of British Columbia herring fishery and spawn abundance. In order to simplify data tabulation, interpretation and comparison with previous years, all tonnage is given in short tons (907.18 kg).

METHODS

The information for the fishery portion of this report was obtained from fishery officers' daily radio telephone reports to Field Operations Headquarters in Vancouver. These reports contain pre-fishery test data (tonnage, fish length and roe maturity), gear counts, opening and closure times, hailed catches and weather conditions.

Spawn data were obtained from annual spawn reports compiled by DFO field staff. These reports document timing and location of individual spawnings as well as length and width of spawn depositions, average layers of eggs on each type of subtrate utilized and percentage of vegetation cover.

Field staff measure spawn patches at low tide by pacing them out and plotting them on large scale charts or shoreline vegetation maps made from aerial photographs (e.g. Haegele and Hamey 1979). In order to determine the extent of sub-tidal depositions, a raking apparatus is dragged along the sea bottom to catch pieces of vegetation along with whatever eggs may be attached. This method has been unreliable in areas where the vegetation is sparse or spotty; therefore, whenever possible, spawns are surveyed by divers using snorkles or S.C.U.B.A. gear.

For this report, spawn data were converted to a standard measurement (standard square meters at medium intensity - SSM) so that spawnings can be compared from area to area and year to year. Standard square meters are calculated by multiplying the length of deposition by the width times a weighting factor based on intensity of egg deposition (Table 1) times the percentage of the spawn area containing vegetation.

In past years, spawnings have been assigned to the various intensity categories in the field. This evaluation tended to be very subjective since it was based on the overall impressions of the thickness of the spawn and the observers' memories of past years' spawnings. As a result, considerable inconsistencies in the data occurred. In order to overcome this problem, a method was developed whereby the intensity factor was based on the actual layers of eggs deposited on the various types of vegetation (Table 2). An example of calculating the standard square meters of spawn in an area is given below.

> A deposition of 600 m by 15 m at an average thickness of 4 layers on brown algae with 60% vegetation cover is 600 x 15 x 1.4 x 0.6 = 7,560 SSM. These numbers often become large and unwieldy for extensive spawnings, so they are converted to a base unit of 1,000 square meters; thus 7,560 SSM become 7.56 k SSM.

1982 HERRING FOOD AND BAIT FISHERY

Due to the projected poor marketability of food herring in 1982, the Industry was asked for ways to rationalize the 1982 fishery and still account for providing for domestic bait requirements, and some domestic secondary processed products. The outcome of this was to limit the size of the 1982 fishery by means of a vessel quota system applied to individual processing companies. Under this system, any processing plant which processed food or bait herring during the previous two years would be allocated a 50-ton quota of herring. Each company would designate one catch vessel only for their quota and this vessel would be eligible for a food and bait licence issued by the Department of Fisheries and Oceans. It was anticipated that with a four-week time period in which to fish and a total coastwide quota of less than 2,000 tons, the 1982 catches would have regulated quick deliveries and prompt processing. In general, this was the case although a few problems were experienced mainly resulting from excessively large sets by some individual vessels and from not pre-chilling the water in their Refrigerated Sea Water (RSW) and Champagne Sea Water (CSW) cooling systems.

Guidelines for the 1982 food and bait fishery were issued to Industry in October 1982. These guidelines provided information on export, entry and licensing requirements as well as current regulations and proposed fishing patterns. Fishing in all waters was to take place on or after November 15, with individual areas open by Public Notice as the stocks warranted.

NORTH COAST FISHERY

Out of the allotment of 300 tons for six companies in the North Coast, only three companies took part in the fishery. The entire North Coast area was

Table 1. Herring spawn intensity categories and weighting factors used to calculate standard square meters (SSM).

Intensity category	Very light (VL)	Very Light Light (VLL)	Light (L)	Light Medium (LM)	Medium (M)	Medium Heavy (MH)	Heavy (H)	Heavy Very Heavy (HVH)	Very Heavy (VH)
Weighting factor	0.05	0.2	0.4	0.65	1.0	1.4	1.9	2.4	3.0

Table 2. Conversion from layers of herring eggs to spawn intensity categories (from Haegele et al. 1979).

Substrate	Layers of eggs								
Stringy (grasses, brown algae, stringy reds)	<0.25	0.5	1.0	2.0	3.0	4.0	6.0	7.0	7.8
Leafy (rockweed, kelp, leafy reds)	<0.25	0.5	1.0	1.5	2.0	2.5	3.0	7.5	7.4
Herring spawn intensity based on layers of eggs	**Very light (VL)**	**Very Light Light (VLL)**	**Light (L)**	**Light Medium (LM)**	**Medium (M)**	**Medium Heavy (MH)**	**Heavy (H)**	**Heavy Very Heavy (HVH)**	**Very Heavy (VH)**

opened November 15 until December 3 with an extension of five days from December 5 to December 10 in sub-areas 4-3, 5-11, 5-20 and 105-1 to allow a quota clean up; however, due to inclement weather this extension was not utilized. A total of 133.5 tons of herring were landed by the three vessels. All catches were made in Area 1, near Shag Rocks. One vessel attempted a fishery in the Central area but was unsuccessful due to a high incidence of small fish.

SOUTH COAST FISHERY

A total of 1,438 tons of herring were caught in the South Coast and of this, 50 tons were caught in sub-area 13-14 and 1,388 were caught in sub-areas 17-2, 17-3 and 17-4. The South Coast was opened on November 15 until December 7. A total of 36 landings were recorded during this time period, and with a few exceptions, quality was generally very good.

In summary, during the 1982 food and bait fishery, a total of 1,571.5 tons of herring were landed coastwide. The largest portion came from the lower Strait of Georgia (1,388 tons); the rest was caught in the Queen Charlotte Islands (133.5 tons) and the lower Johnstone Strait (50 tons).

1983 ROE HERRING FISHERY

The roe herring area Licensing Program was re-implemented in 1983. As in past years, each holder of a roe herring licence was asked to choose one of the areas in which to fish. The three areas and the distribution of licensed gear by area for 1983 are shown in Table 3.

In addition to area licensing, the concept of using a fixed quota for each area was introduced. Fixed quotas have been used in the past to regulate reduction fisheries and food and bait fisheries, but were new to the roe herring fishery.

Prior to 1983, herring stocks were assessed by extensive sounding programs using echo sounders to estimate stock abundance. Fish in excess of established spawning requirements were then deemed available for harvest. This posed many difficulties for the fishery manager, since soundings were often inaccurate even when conducted by skilled and experienced people. In some cases, stock built up rapidly and fish spawned before assessments could be completed. In other cases, stocks moved in very slowly, spawning a few at a time. When the spawned out fish mixed with the unspawned fish, any possible fishing opportunity was lost. The use of a fixed quota meant that managers could set up fisheries on the first available stock of suitable maturity and provide for a more orderly fishery. Also, management pressures were considerably reduced. The fixed quotas were to be adjusted annually depending upon escapement during the last year.

In 1983, the total quota was set to provide for a 55%:45% seine/gillnet catch division coastwide (Table 4). The anticipated quotas for each licensed area are detailed in Table 4. The actual 1983 roe herring catches are given in Table 5 (hailed catches) and Table 6 (preliminary sales slip data). The annual roe herring catches by Statistical Area and gear type are shown for the years 1980 to 1983 in Table 7 for Area A, Table 8 for Area B and Table 9 for Area C.

Table 3. Distribution of licensed gear by gear type and roe herring area, B.C., 1983.

Roe herring area	Number of licensed vessels	
	Seines	Gillnets
Area A - North of Cape Caution	105	546
Area B - Strait of Georgia	87	558
Area C - West Coast Vancouver Island	47	211
TOTAL:	239[a]	1,315

[a] Seine total does not include 12 chartered seiners.

Table 4. Anticipated roe herring catches by roe herring area, B.C., 1983.

Roe herring area	Anticipated catch (tons)		
	Seines	Gillnets	Total
Area A - North of Cape Caution	8,400	4,600	13,000
Area B - Strait of Georgia	5,600	7,300	12,900
Area C - West Coast Vancouver Island	3,000	2,000	5,000
TOTAL:	17,000	13,900	30,900
Target catch division	55%	45%	

Table 5. Hailed roe herring catches by gear type and roe herring area, B.C., 1983.

Roe herring area	Hailed catch (tons)		
	Seines	Gillnets	Total
Area A - North of Cape Caution	8,770	5,100	13,870
Area B - Strait of Georgia	6,600	8,833	15,433
Area C - West Coast Vancouver Island	5,100	2,640	7,740
TOTAL:	20,470	16,573	37,043
Achieved catch division	55%	45%	

Table 6. Roe herring catches by gear type and roe herring area from preliminary sales slip data, B.C., 1983.

Roe herring area	Catch (tons)		
	Seines	Gillnets	Total
Area A - North of Cape Caution	8,456	4,738	13,194
Area B - Strait of Georgia	8,447	9,451	17,898
Area C - West Coast Vancouver Island	6,278	2,866	9,144
TOTAL:	23,181	17,055	40,236
Achieved catch division	58%	42%	

Table 7. Annual hailed roe herring catches in Area A (north of Cape Caution) by Statistical Area and gear type, B.C., 1980-1983.

Year	Gear type[a]	Hailed catch (tons) by Statistical Area								Total Area A by gear	Overall total Area A
		1	2E	2W	3	4	5	6	7		
1980[b]	SN	-	1,645	930	-	-	1,690	-	-	4,265	
	GN	100	1,366	312	-	-	1,290	661	-	3,729	
											7,994
1981	SN	-	4,340	1,000	-	-	1,200	-	-	6,540	
	GN	-	1,732	-	-	-	410	1,437	1,099	4,678	
											11,218
1982	SN	-	2,785	1,297	-	-	-	-	2,625	6,707	
	GN	-	1,541	-	-	-	-	407	3,768	5,716	
											12,423
1983	SN	-	5,030	1,470	-	-	-	-	2,200	8,700	
	GN	-	1,100	-	-	-	-	2,500	1,500	5,100	
											13,800

[a] SN - seine, GN - gillnet.
[b] Strike year.

Table 8. Annual hailed roe herring catches in Area B (Strait of Georgia) by Statistical Area and gear type, B.C., 1980-1983.

Year	Gear type[a]	Hailed catch (tons) by Statistical Area					Total Area B by gear	Overall total Area B
		14	15	16	17	18		
1980[b]	SN	290	-	-	-	-	290	
	GN	3,757	-	-	-	-	3,757	
								4,047
1981	SN	3,000	-	-	-	-	3,000	
	GN	7,024	-	-	-	-	7,024	
								10,024
1982	SN	-	-	-	3,400	-	3,400	
	GN	6,000	-	-	-	-	6,000	
								9,400
1983	SN	1,600	3,200	-	1,800	-	6,600	
	GN	8,833	-	-	-	-	8,833	
								15,433

[a] SN - seine, GN - gillnet.
[b] Strike year.

Table 9. Annual hailed roe herring catches in Area C (West Coast Vancouver Island) by Statistical Area and gear type, B.C., 1980-1983.

Year	Gear type[a]	Hailed catch (tons) by Statistical Area 23	24	25	26	Total Area C by gear	Overall total Area C
1980[b]	SN	-	2,403	-	-	2,403	
	GN	-	900	2,000	750	3,650	
							6,053
1981	SN	3,400	-	3,000	-	6,400	
	GN	620	1,796	1,500	745	4,661	
							11,061
1982	SN	3,385	700	-	300	4,385	
	GN	-	885	2,100	400	3,385	
							7,770
1983	SN	5,100	-	-	-	5,100	
	GN	-	-	2,450	190	2,640	
							7,740

[a] SN - seine, GN - gillnet.
[b] Strike year.

Table 10. Annual landed weight and value of British Columbia roe herring catches, 1979-1983[a].

Year	Landed Weight (tons)	Landed value ($ million)
1979	42,807	120.86
1980[b]	19,330	22.06
1981	32,087	34.68
1982	29,593	27.01
1983	40,236	47.91

[a] Used hailed catches for 1979 to 1982 and sales slip data for 1983.
[b] Strike year.

Statistical Areas in British Columbia are shown in Figures 1 and 2, and the 1983 herring fishing boundaries in Figures 3a-m. All figures are appended at the end of the report.

Briefly, the 1983 roe herring fishery accounted for a coastwide catch of 40,236 tons (sales slip data). Of this total, 13,194 tons were caught in Area A (north of Cape Caution), 17,898 tons in Area B (Strait of Georgia) and 9,144 tons in Area C (West Coast Vancouver Island) (Table 6).

The landed value of the roe herring catch in 1983 was approximately 47.9 million dollars. This compares with $27.0 million in 1982 when 29,593 tons were caught and $34.7 million in 1981 when 21,087 tons were caught (Table 10). The 1983 evaluation was based on an average price paid that year for gillnet-caught herring of $1,450/ton and for seine-caught herring of $1,000/ton.

A summary of the 1983 in-season stock assessment and the resultant fisheries in each area is presented below.

QUEEN CHARLOTTE ISLANDS SUB-DISTRICTS (AREAS 1, 2E, 2W)

Area 2E - Assessment

Echo sounding carried out on February 20 by the "FPV Arrow Post" indicated 2,000-2,500 tons of herring in the outer Skincuttle Inlet area. A roe test conducted on a small sample, (90-135 kg) indicated 8.5% roe maturity with a mixture of mature and immature fish. On February 27, 1,500-2,000 tons of herring were located near Bag Harbour, and were tested at 8.5% roe maturity. Assessment remained unchanged until March 5 when the fish in Bag Harbour were reported to have moved out to Kingfisher Cove. On March 6, 2,000-3,000 tons were located in lower Juan Perez Sound near Huxley Island. Testing conducted on March 7 off the north shore of Huxley Island and outside Section Cove yielded 11.5% and 14% roe maturity respectively. On March 10, soundings indicated 1,500-2,000 tons in the Huxley Island and 3,000 tons off Harriet Harbour in outer Skincuttle Inlet. These fish were tested at 13.6% roe maturity. By March 14, stocks in Poole Inlet had built to 2,000-3,000 tons and a light spawn was in progress. On March 16, soundings indicated 2,000 tons in Poole Inlet and 7,000-10,000 tons north of Huxley Island. These fish began spawning along the north shore of Burnaby Island on March 22. There were no significant amounts of herring observed in Atli Inlet this year and no spawn was recorded there.

Area 2E - Fishery

Seines

Juan Perez Sound, sub-area 2-13 (Fig. 3a), opened to seines from 1021 hrs until 1451 hrs March 9; 71 seines participated in the fishery and the hailed catch was 5,030 tons, tested at 9.5% to 14% roe maturity.

Gillnets

On March 15, a gillnet fishery commenced at 1200 hrs until 2100 hrs in the approaches to Poole Inlet and along the Burnaby Island shoreline, sub-area

2-14 (Fig. 3b). Hailed catches indicated 1,100 tons taken by 140 gillnets. Roe tests ranged between 12% and 14% maturity.

Area 2W - Assessment

Louscoone Inlet

Soundings on Feburary 18 located 400-600 tons in Louscoone Inlet. Stocks built slowly and by March 13, over 2,500 tons were located in the area. Testing on March 13 and 14 indicated roe maturities of 10% and 15% respectively.

Port Louis

No herring were observed in Port Louis until March 2 when 2,000 tons were located on the outside. Testing showed less than 1% roe maturity with a high incidence of #3 (immature) roe. On March 4, 3,500 tons of herring were located in Port Louis/Otard Bay. By the next day the estimate had declined to 100 tons in Otard Bay and nil in Port Louis.

Inskip Channel

On March 7, 500 tons of herring were located in Inskip Channel. These stocks increased rapidly to 3,000 tons over the next few days. Roe percentages remained around 0% until March 15 when maturity was tested at 2%. Sampling on March 19 indicated a roe maturity of 9%. By March 23, stock strength had diminished to 300 tons.

Area 2W - Fishery

Seines

Inskip Channel opened for seines from 0916 hrs to 2002 hrs on March 21 in sub-areas 2-37 and 2-38 (Fig. 3c). The hailed catch was 1,470 tons. Of the 70 boats participating, only 40 caught fish.

CENTRAL COAST SUB-DISTRICTS (AREAS 6, 7, 8, 9, 10)

Area 6 - Assessment

Pre-fishery stock assessments showed an early build-up in Kitasu Bay from 800 tons on March 4 to 2,500 tons on March 6, followed by a drop to around 600 tons by March 12. In Higgins Pass, 600-700 tons were observed on March 8. These stocks increased to 6,000 tons by March 18 then decreased to approximately 1,000 tons on March 20. Indications were that these fish moved out to the west coast of Price Island. The Weeteam Bay stock moved into the bay around March 15, about one week later than average and never built up to more than 600-700 tons.

Area 6 - Fishery

Gillnets

On March 21, between 1330 and 1800 hrs, sub-areas 6-16, 6-18 and that part of 7-1 comprising the west coast of Price Island (Wilby Point to Day Point) opened to gillnets (Fig. 3d). A total of 2,500 tons were hailed by 380 gillnets with best catches occurring near the southerly end of Price Island.

Area 7 - Assessment

Soundings made on March 2 located 5,200-6,000 tons in Area 7. Of this total, 1,500-2,000 tons were in the Thompson Bay/Waskesiu Pass area, and 3,000 tons were in Boddy Pass. Testing indicated large fish and 0% roe maturity. On March 3, 1,000 tons were located on the west side of Waskesiu Pass, 70-100 tons in Reid Pass and 4,000-5,000 tons in Boddy Pass at Clarie Island. By March 9, total stocks in Area 7 had built to 10,000-12,000 tons, and roe testing at various locations still indicated 0% roe maturity.

A test on March 10 at Berry Inlet and Stryker Bay showed an increase in roe maturity to 2.7% and 1.2% respectively. Within the next two days 1,300-1,500 tons were located in Stryker Bay and these tested out at 3.2% roe maturity. In Thompson Bay, tests made on March 11 indicated 6.8% roe maturity, increasing to 10% by March 15. During the following week, stock abundance in Area 7 varied between 6,000 and 10,000 tons and roe tests ranged between 10.9% and 13.7%.

Area 7 - Fishery

Seines

A seine fishery took place in the East Houghton Islands, sub-area 7-19 (Fig. 3e) on March 15 between 1222 hrs and 1237 hrs (15 min fishery). A total of 2,200 tons were hailed by 94 seines. Samples taken from the catches indicated about 12% roe maturity.

Gillnets

A gillnet fishery took place on March 23 between 1400 hrs and 1700 hrs. In order to alleviate fleet congestion, a large portion of Area 7 was opened (sub-areas 7-1, 7-2, 7-9, 7-18, 7-19, 7-20, 7-23; Fig. 3f). However, due to the distribution of the fish, the fleet concentrated in the Houghton Island, Thompson Bay, Stryker Bay and Cecilia Island areas. A fleet of 500 gillnets hailed 1,500 tons with roe maturities averaging 13.5%.

MIDDLE EAST COAST SUB-DISTRICTS (AREAS 13, 14, 15, 16)

Area 13 - Assessment

During initial soundings in mid-February, 700-800 tons of mixed size fish were located in Deep Water Bay. A further 200 tons were reported in Okisollo

Channel and Hoskyn Channel. By February 23, stocks in Deep Water Bay increased significantly to 4,500-5,000 tons. Sampling indicated that the stock was comprised mainly of small fish with a 0% roe yield. By the end of February, there was a build up to 20,000 tons in Hoskyn Channel, and these were mostly immature fish. These fish stocks began to break up and move out of the area by March 2 and continued to scatter during the next few days.

On March 10, 2,000 tons of herring were identified along the east side of Quadra Island, and the next day these fish started spawning near Francisco Point. There was no commercial fishery in Area 13.

Area 14 - Assessment

On February 15, 700-800 tons of herring were located in Deep Bay. By February 19 the stocks had increased to 1,000-1,300 tons and were tested at 0% roe maturity. On February 23, the areas from Chrome Island to Cape Lazo and from Parksville to Chrome Island were sounded but no fish were observed. A skimmer of fish was sighted off Denman Island in Baynes Sound on February 24 but no tonnage estimate was available.

The 1,000-1,300 tons located in Deep Bay were tested on February 23 at 3.1% roe maturity indicating some increase in roe maturity. On the morning of February 26, 2,000 tons of herring were observed in Baynes Sound, and during the day these stocks built up to 3,000-4,000 tons. These were tested at 9.9% roe maturity and were all large fish. Further soundings in North-West Bay showed a few scratches with a light spawn occurring in Nuttal Bay. Samples taken at Ford Cove/Lambert Channel on March 1 indicated roe maturities of 8% and 6.2% with some slinks present in the tests. Tests made the same day at Deep Bay, Qualicum Beach and Chrome Island yielded a large quantity of spawned out fish. By the end of the week, a substantial spawn was in progress in the Cape Lazo area and on the west side of Denman Island.

Area 14 - Fishery

Seines

On February 27 between 1205 hrs and 1900 hrs, a portion of sub-area 14-11 was opened to seines (Fig. 3g). Fourteen seines were in the area at the opening. This number increased to 30 by the time the area was closed. The hailed catch of 1,600 tons was tested for an average roe maturity of 12%.

Gillnets

Sub-areas 14-7 and 14-10 opened to gillnets from 1600 hrs February 27 to 1200 hrs March 1 (Fig. 3h). Initially there were approximately 200 punts operating but this increased to 300 at the closure. Total hailed catch was 8,833 tons.

Area 15 - Assessment

On February 14, 3,000-4,500 tons of herring were located off Lund and roe testing indicated 0% maturity. This body of fish continued to stay in the Lund

area and on February 23, soundings indicated 3,000 tons still with a 0% roe maturity. On February 24, a further 3,000 tons were located off the Powell River Mill. This was an increase of 2,500 tons from the 500 tons located here on the previous day. On February 25, additional fish were located off Sliammon and also off Grief Point, bringing the total estimate between Grief Point and Lund to 7,000 tons. Roe testing off Grief Point indicated 3% roe maturity.

By February 27, stocks off Lund had built to 7,000 tons. In addition, soundings around the Powell River Mill area indicated 3,000-3,500 tons bringing the total for the area to about 10,000 tons. A test on the fish at the Mill showed 4.5% roe maturity. Further testing on March 2 indicated roe maturities of 5.3% off Powell River and 5.7% off Lund. On March 4, tests indicated 8.5% roe maturity off the Mill and 10.7% off Sliammon. Stock estimates at this time were about 1,000 tons. Early on the morning of March 5, three test vessels assessed the Sliammon area and roe tests indicated an average roe maturity in excess of 10%. By March 6, spawned out fish began to move into the area and roe maturities quickly dropped off.

Area 15 - Fishery

Seines

A seine fishery took place on March 4 between 0918 hrs and 1451 hrs in the vicinity of Powell River Mill (sub-area 15-2; Fig. 3i). The 84 vessels in the area hailed 900 tons. Just prior to the closure, immature fish began moving north from the Westview area and some sets made on the boundary resulted in low maturity fish.

On Marh 5, a second opening took place in the same locality (Fig. 3i). The area opened at 0800 hrs and closed at 0940 hrs. Hailed catches were 2,300 tons and roe tests from the commercial catches showed a yield of 9.5% or higher.

LOWER EAST COAST SUB-DISTRICTS (AREAS 17, 18, 19)

Area 17 - Assessment

On February 22, stocks in the lower portion of Area 17, below Dodds Narrows were estimated at between 12,000 and 15,000 tons. Through February 24 and 25, the test vessel found herring in Plumper Sound (250 tons), Swanson Channel (1,000 tons), Satellite Channel (3,000 tons), Porlier Pass (10,000 tons) and Pylades Channel (1,000 tons). Tests carried out on these stocks indicated roe maturities of around 0%.

On February 26, the test boat moved to Nanoose Bay. Approximately 900 tons were located in the bay and these tested out at 3% roe maturity. By March 1, this stock had built to 3,000 tons and had an average roe yield of 9.8%. After the fishery on March 2, the stocks rapidly dwindled and a roe test conducted on March 3 gave 0% maturity with most of the sample comprised spawned out fish. Soundings were continued below Dodds Narrows but by March 5 only 3,000 tons could be located between Porlier Pass and Active Pass. By this time, spawning was taking place around Thetis Island and Ladysmith, eliminating the probability of any further fisheries in this area.

Area 17 - Fishery

Seines

A "false start" occurred in the afternoon of March 1 at Nanoose Bay. Catches taken were not included in final figures and were not deducted from the quota.

Nanoose Bay opened to seines at 0835 hrs until 1435 hrs on March 2. Fishing was restricted to sub-area 17-7 (Fig. 3j). Eighty-five seines participated and the hailed catch was 1,800 tons. Roe tests conducted prior to the fishery indicated 11% roe maturity; the fleet, however, was warned of a possibility of obtaining spawned out fish from a small spawning occurring along the southern shoreline. There were also small immature stocks in the area. Many sets were released due to poor roe yields.

LOWER WEST COAST VANCOUVER ISLAND SUB-DISTRICTS (AREAS 23, 24)

Area 23 - Assessment

No appreciable stocks were located in Barkley Sound until February 25 when small scattered schools estimated at 1,000 tons were located around Chrow Island and Forbes Island. Testing conducted at Forbes Island indicated 8.5% roe maturity. By February 28, stocks had increased to 3,000-3,500 tons, with approximately 1,500 tons of this total reported in Pipestem Inlet. Roe tests taken in Pipestem Inlet averaged 11% maturity.

During the evening of February 28, three commercial vessels along with the test vessel conducted an extensive sounding survey off the Macoah Pass, Toquart Bay and Pipestem Inlet areas. Total stocks for the area were estimated at 3,000-4,200 tons with 1,500-2,000 tons in Toquart Bay, 750-1,000 tons in Pipestem Inlet, 500-800 tons in Mayne Bay and 300-400 tons in Macoah Pass.

On the morning of March 1, further sounding showed a considerable movement of stocks into Pipestem Inlet with herring estimates ranging between 1,600 and 2,200 tons. The fish were in large broken schools and moving out towards Toquart Bay with the tide. After the fishery, no major body of fish was located in the Barkley Sound area.

Area 23 - Fishery

Seines

A seine fishery took place on March 1 from 1034 hrs to 1400 hrs. Fishing occurred in a portion of sub-area 23-10 (Fig. 3k). Forty-eight seines participated and hailed a catch of 5,100 tons. Roe yields from commercial vessels were excellent with some tests as high as 14%.

Area 24 - Assessment

On February 25, 600 tons of herring were located in Miller Channel, 200

tons in Bawden Bay and 2,000-3,000 tons outside Steamer Cove. The fish in Miller Channel and Bawden Bay tested out at 2% and 7.2% roe maturities respectively. On February 26, total estimate of stocks in the Sydney/Shelter Inlets was approximately 3,000-5,000 tons. By February 28, very few fish were located in Sydney or Shelter Inlets, but a spawn was in progress in Hesquiat Harbour, and it was felt that these fish had moved there to spawn.

On March 3, approximately 1,000 tons of herring were located in Father Charles/Maurus Channels, and these tested out at 9.9% roe maturity.

There was never any major build up of stocks in the lower Clayoquot Sound area and the maximum tonnage estimate was made on March 7 when 3,000-4,000 tons were thought to be in the area. There was no commercial fishery in Area 24 in 1983.

UPPER WEST COAST VANCOUVER ISLAND SUB-DISTRICTS (AREAS 25, 26, 27)

Area 25 - Assessment

The assessment program began on February 25. Soundings were initially carried out in the Nootka Sound area but due to the lack of stocks, 200-500 tons in Zuciarti Channel, the main focus was centered in Esperanza Inlet. Approximately 1,000-1,500 tons of herring were located in Esperanza during the evening of February 25. These fish were concentrated in numerous schools between Center Island and Double Island. Testing indicated two distinct groups with roe maturation ranging from 0% from tests at Double Island to 9% from tests off Espinosa Inlet. The fish were very large with an average length of 21-22 cm. By February 27, stocks had built to 3,000-4,000 tons and roe maturities were 8%-10%. At this time, fish were also reported in Port Langford - Nuchatlitz Inlet and gillnet tests made on these fish indicated 10.5% roe maturity. These tests however, had a high male to female ratio giving rise to lower than normal maturities. During the early morning of March 3, soundings indicated a large build up of fish near the beach. The stocks had risen from 1,000 tons to 3,000 tons overnight and roe maturities from gillnet tests were 10.5%-11% in Port Langford, 12% in Outer Nuchatlitz, and 12.5%-13% in Inner Nuchatlitz. By this time, the males were very ripe and indications were that a major spawn was imminent.

Area 25 - Fishery

Gillnets

A gillnet fishery took place on March 3 between 0900 hrs and 2200 hrs in sub-areas 25-13 and 25-14 (Fig. 31). Approximately 150 gillnets participated and 2,450 tons were hailed. The fishery was closed sooner than originally anticipated due to the extremely heavy fishing activity by the fleet. Catches tested out between 10.5% and 13% roe maturity.

Area 27 - Assessment

On February 28, 500-1,000 tons of herring were located in Winter Harbour

and small isolated spawnings were being reported at this time. The following day the stocks had built to 3,000-4,000 tons with fish continuing to move into the area. By March 14, total tonnage in the area reached 5,000-6,000 tons and consisted of largely spawned out fish.

Area 27 - Fishery

Gillnets

Winter Harbour (Fig. 3m) opened to gillnets on February 28 at 1400 hrs until 0800 hrs March 4. At the time of opening, two gillnets were on the grounds. Participation in the fishery increased to six gillnets on March 2 and by March 3, 10 boats were operating. Total catch was estimated at 190 tons, with roe tests yielding 12%-17%.

1983 SPAWN-ON-KELP FISHERY

Since 1975, spawn-on-kelp harvesting has been conducted throughout British Columbia. Presently, 28 persons hold spawn-on-kelp licences ("J") and each licence authorizes production of 7.25 tonnes of processed product. Prior to 1983, the standard weight used was "drained weight" in which the totes used to transfer the spawn-on-kelp could be drained for up to 12 hours prior to weighing at the processing plant. In addition, 5% of the weight was deducted for salt allowance. Numerous problems arose with this measuring system due to the time involved in weighing the totes, transferring the product, and weighing the totes again. This system proved to be cost inefficient to both the fishermen and producers. In order to prevent any further problems, "processed product weight" was adopted as the standard measurement.

Another change from previous years was the use of "open ponding" as an option to the "closed ponds." This change in policy resulted from a study done by Shields and Kingston (1982) that revealed major problems with the "closed ponds". First, the overall mortality of impounded herring was very high, in some cases up to 40%, and secondly the percentage of spawned out females in most ponds was never greater than 50%.

In the open ponding method, no webbing is used and kelp is hung from log frames. Shields and Kingston (1982) suggested that the open pond method offers the following advantages over the closed pond systems:

1. There is no requirement to handle or impound the fish, eliminating problems with injury and mortality.

2. The amount of equipment required for the operation is reduced as there is no need for web enclosures.

3. Almost all the fish spawn since spawning occurs in a natural state.

The entire open ponding method is described in detail by Shields and Watson (1983).

Total roe-on-kelp production during the 1983 season was 224,724 kg. This compares with 191,145 kg in 1981 and 174,810 kg in 1982. In 1983, the distribution of licences by area was as follows:

1. Queen Charlotte Islands - 11 licences
2. North Coast - 9 licences
3. Central Coast - 3 licences
4. Strait of Georgia - 4 licences
5. West Coast Vancouver Island - 1 licence

All licence holders operating in the Queen Charlotte Islands used the open pond method and were very successful in fulfilling their quotas with high grade product.

1983 HERRING SPAWN SUMMARY

A total of 15.6 million standard square metres (SSM) of spawn were recorded for the British Columbia coastline during 1983 (Tables11 and 12). This was a decrease from 1982 when 17.6 SSM were deposited and below the 1980-82 average of 17.3 million SSM.

North of Cape Caution, both the Queen Charlotte Islands (Areas 1, 2W, 2E) and Central Coast (Areas 6-10) showed a decrease in spawn while the North Coast (Areas 3-5) showed a significant increase. In the South Coast, the Strait of Georgia (Areas 13-18) was well below the 1982 spawn level and slightly below the 1980-82 average, while the West Coast (Areas 23-27) was above the 1982 spawn level, but below the 1980-82 average.

The following is a summary of spawnings by herring roe district. Herring spawn depositions are shown by Statistical Area in Table 11 for northern B.C. and in Table 12 for southern B.C. Individual 1983 herring spawnings are listed in Table 13 at the end of this section.

QUEEN CHARLOTTE ISLANDS SUB-DISTRICTS (AREAS 1, 2E, 2W)

The 1,578.3 SSM of spawn deposited in the Queen Charlotte Islands were the lowest recorded since prior to 1980. The 1,020.71 SSM of spawn in Area 2E were below the 1980-82 average of 1,430.7 SSM and below the 1982 deposition of 1,223.6 SSM. The 1983 deposition of spawn in Area 2W (556.1 SSM) was similar to the 550.6 SSM recorded there in 1982 and well above the 1980-82 average of 292.6 SSM.

The 1.5 SSM of spawn recorded in Area 1 did not reflect the actual amount of spawn deposited due to the lack of operational days for carrying out assessment surveys. However, spawnings in Area 1 comprised only a small percentage of the total deposition for the Queen Charlotte Islands.

NORTH COAST SUB-DISTRICTS (AREAS 3, 4, 5)

The North Coast exhibited a dramatic increase in spawn in 1983 with both Areas 4 and 5 being well above average. Spawn deposition in Area 4 increased

Table 11. Standard square meters (SSM x 1000) of herring spawn deposited in northern British Columbia by herring district and Statistical Area, 1980-1983.

Area	1980	1981	1982	1983	(3-year average) 1980-82
Queen Charlotte Islands					
1	110.82	39.36	110.82	1.54	87.00
2E	1,550.65	1,517.98	1,223.57	1,020.71	1,430.73
2W	115.39	211.71	550.55	556.08	292.55
	1,776.86	1,769.05	1,884.94	1,578.33	1,810.28
North Coast					
3	170.95	291.16	28.18	49.05	163.43
4	317.72	565.36	727.02	1,765.60	536.70
5	735.27	410.23	359.58	864.14	501.69
	1,223.94	1,266.75	1,114.78	2,678.79	1,201.82
Upper Central Coast					
6	727.41	490.06	423.94	660.25	547.14
	727.41	490.06	423.94	660.25	547.14
Lower Central Coast					
7	1,194.52	1,072.67	1,544.98	1,058.96	1,270.72
8	325.70	164.40	190.32	168.52	226.81
9	10.05	2.86	54.02	11.32	22.31
10	41.25	13.91	181.76	54.21	78.97
	1,571.52	1,253.84	1,971.08	1,293.01	1,598.81
Total North Coast	5,299.73	4,779.70	5,394.74	6,210.38	5,158.05

Table 12. Standard square meters (SSM x 1000) of herring spawn deposited in southern British Columbia by herring district and Statistical Area, 1980-1983.

Area	1980	1981	1982	1983	(3-year average) 1980-82
Upper East Coast					
11	6.35	0.82	-	2.99	2.39
12	358.85	217.37	167.27	72.16	247.83
	365.20	218.19	167.27	75.15	250.22
Middle East Coast					
13	193.75	272.53	480.69	617.16	315.66
14	3,938.85	2,205.83	6,195.81	3,325.83	4,113.50
15	538.72	848.98	1,234.10	537.46	873.93
16	42.32	0.44	10.80	-	17.85
	4,713.64	3,327.78	7,921.40	4,480.45	5,320.94
Lower East Coast					
17	2,096.58	1,085.64	2,173.27	1,819.72	1,785.16
18	70.13	114.08	37.42	7.50	73.88
	2,166.71	1,199.72	2,210.69	1,827.22	1,859.04
Lower West Coast					
23	1,091.04	426.42	291.81	928.11	603.09
24	2,368.81	1,792.94	168.64	181.36	1,443.46
	3,459.85	2,219.36	460.45	1,109.47	2,046.55
Upper West Coast					
25	998.55	625.80	720.36	561.15	781.57
27	3,777.76	1,173.12	722.23	1,378.69	1,891.04
	4,776.31	1,798.92	1,442.59	1,939.84	2,672.61
Southern Mainland					
29	0.84	-	-	-	0.28
Total South Coast	15,482.55	8,763.97	12,202.40	9,432.13	12,149.64
COASTWIDE	20,782.28	13,543.67	17,597.14	15,642.51	17,307.69

from 727.0 SSM in 1982 to 1,765.6 SSM in 1983. This was one of the best spawnings on record and well above the 1980-82 average of 536.7 SSM. Area 5 also showed a significant increase, from 359.6 SSM in 1982 to 864.1 SSM in 1983. Area 3 showed a slight increase over the previous year, but was still well below average for the area.

CENTRAL COAST SUB-DISTRICTS (AREAS 6, 7, 8, 9, 10)

Spawnings in the Central Coast were down from the previous year in all areas except Area 6 where spawn deposition increased from 423.9 SSM in 1982 to 660.3 SSM in 1983. Area 7 declined from 1,545.0 SSM in 1982 to 1,059.0 SSM in 1983. Both Areas 6 and 7 showed a somewhat different spawning distribution from recent years. In Area 6, Weeteam Bay and Kitasu Bay had light depositions while the majority of spawning took place along the west shore of Swindle Island and Price Island. In Area 7, major spawnings occurred in Spiller Channel. Good spawnings also occurred in Joana Channel, Thompson Bay, and between St. John's Harbour and Cape Swaine. The southern portion of Area 7 (Clutus Sound, Spider Anchorage and Spitfire Channel) had only very light spawnings. Spawnings in Areas 8, 9 and 10 were all well below the 1980-82 averages.

UPPER EAST COAST SUB-DISTRICTS (AREAS 11, 12)

The declining trend for Areas 11 and 12 continued in 1983. The 75.2 SSM deposited there in 1983 were well below the 1980-82 average of 250.2 SSM. Area 12 has decreased from 359.8 SSM in 1980 to 72.2 SSM in 1983. This decline may possibly be related to a continued increase in spawn in Area 13.

MIDDLE EAST COAST SUB-DISTRICTS (AREAS 13, 14, 15, 16)

Spawning in these herring sub-districts decreased dramatically in 1983 from the previous year. This can be attributed mainly to the reduced spawn deposition in Area 14. The distribition of spawn seems to be continuing in its northward movement. Area 13 showed an increase over previous years from 193.8 SSM in 1980 to a high of 617.2 SSM in 1983. Spawning was mainly concentrated in the Cape Mudge - Francisco Point area. Area 14 on the other hand, decreased from 6,195.8 SSM in 1982 to 3,325.8 SSM in 1983. Spawning in the lower portion (French Creek - Qualicum Beach) was especially poor in 1983. Area 15 also had about half the spawn deposition recorded the previous year, decreasing from 1,234.1 SSM in 1982 to 537.5 SSM in 1983. Area 16 had no spawn recorded.

LOWER EAST COAST SUB-DISTRICTS (AREAS 17, 18)

Spawnings in the lower east coast were just slightly below the average with a total of 1,827.2 SSM of spawn deposited. Although the lower portion of Area 17 (Yellow Point - Thetis Island) decreased from the previous year, there was a spawning in Nanoose Bay which did not occur in 1982. Area 18 continued to decline with only a small deposition of 7.5 SSM recorded in the Ganges area.

LOWER WEST COAST VANCOUVER ISLAND SUB-DISTRICTS (AREAS 23, 24)

Although spawnings increased in Area 23 from 291.8 SSM in 1982 to 928.1 SSM

in 1983, spawn distribution continued to move seaward. Approximately one third of all the spawn recorded in Area 23 was deposited in Ucluelet Harbour, a non-traditional spawning area. There was no spawn recorded in Toquart Bay, David Island, or St. Innes Island, which traditionally had large spawnings.

Area 24 remained extremely poor with only 181.4 SSM of spawn recorded in 1983. The lower portion of Area 24, traditionally the major spawn location for this area, remained at very low spawn levels with only small spawnings reported in Epper Pass, Yellow Bank and Elbow Bank areas. The low levels of spawn observed in lower Area 24 may be offset by fairly good spawnings occurring in Hesquiate Harbour. Unfortunately, due to the early timing of this spawn and lack of manpower, no assessment has been made there during the past two years. This omission may account for the apparent dramatic drop in recorded spawn in 1982 and 1983 over previous years.

UPPER WEST COAST VANCOUVER ISLAND SUB-DISTRICTS (AREAS 25, 26, 27)

Spawnings in Area 25 were low compared with previous years and only 561.2 SSM were recorded. All the spawning took place in the upper portion of the area (Pt. Langford - Nuchatlitz Inlet area). There was no spawning in Nootka Sound during 1983.

Area 27 showed a very good spawning in 1983. The 1,378.7 SSM deposited in 1983 compared favourably with the 722.2 SSM deposited in 1982. Although no spawn assessment occurred in Klaskish Inlet, fishery officers felt it was comparable with past years.

Table 13. Summary of individual herring spawnings, B.C., 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 1, NORTH COAST Q.C.I.							
NADEN HARBOUR	07/04	07/04	100	50	2	0.65	0.35
NADEN HARBOUR	07/04	07/04	25	20	2	0.50	0.05
NADEN HARBOUR	07/04	07/04	100	60	2	0.60	0.48
NADEN HARBOUR	07/04	07/04	60	5	3	0.35	0.08
NADEN HARBOUR	07/04	07/04	300	5	4	0.40	0.58
AREA TOTAL			585.				1.54
AREA: 2W, WEST COAST Q.C.I.							
CLAPP BASIN	26/03	27/03	500	8	7	0.00	7.60
CLAPP BASIN	26/03	27/03	400	8	7	0.00	6.08
CLAPP BASIN	26/03	27/03	200	10	6	0.00	2.80
DOWNIE ISLAND	19/04	20/04	200	100	5	0.00	20.00
DOWNIE ISLAND	19/04	20/04	200	8	5	0.00	1.60
DOWNIE ISLAND	19/04	20/04	700	6	3	0.00	1.68
DOWNIE ISLAND	19/04	20/04	700	4	5	0.00	2.80
DOWNIE ISLAND	19/04	20/04	150	8	6	0.00	1.68
INSKIP CHANNEL	07/04	07/04	1000	8	8	0.00	19.20
INSKIP CHANNEL	07/04	07/04	500	12	8	0.00	14.40
INSKIP CHANNEL	07/04	07/04	300	30	7	0.00	17.10
INSKIP CHANNEL	07/04	07/04	900	6	6	0.00	7.56
INSKIP CHANNEL	07/04	07/04	600	30	7	0.00	34.20
INSKIP CHANNEL	07/04	07/04	900	8	7	0.00	13.68
INSKIP CHANNEL	07/04	07/04	900	10	8	0.00	21.60
INSKIP CHANNEL	07/04	07/04	1500	10	8	0.00	36.00
INSKIP CHANNEL	07/04	07/04	1200	8	7	0.00	18.24
LOUSCOONE INLET	14/03	15/03	300	30	4	0.10	5.26
LOUSCOONE INLET	14/03	15/03	730	10	2	0.15	1.24
LOUSCOONE INLET	14/03	15/03	234	20	4	0.20	2.43
LOUSCOONE INLET	14/03	15/03	400	7	4	0.15	1.55
LOUSCOONE INLET	14/03	15/03	180	60	4	0.50	3.51
LOUSCOONE INLET	14/03	15/03	275	20	5	0.05	5.22
LOUSCOONE INLET	14/03	15/03	730	7	3	0.15	1.74
LOUSCOONE INLET	14/03	15/03	90	5	2	0.00	0.09
LOUSCOONE INLET	14/03	15/03	70	70	4	0.00	3.18
LOUSCOONE INLET	14/03	15/03	360	30	2	0.50	1.08
LOUSCOONE INLET	14/03	15/03	350	30	4	0.10	6.14
LOUSCOONE INLET	14/03	15/03	60	50	4	0.05	1.85
LOUSCOONE INLET	14/03	15/03	300	75	3	0.20	7.20
LOUSCOONE INLET	14/03	15/03	324	20	3	0.15	2.20

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 2W, WEST COAST Q.C.I. CONTINUED							
LOUSCOONE INLET	14/03	15/03	320	15	4	0.35	2.05
LOUSCOONE INLET	14/03	15/03	400	7	4	0.00	1.82
NEWCOMBE INLET	01/04	01/04	300	30	4	0.00	5.85
NEWCOMBE INLET	01/04	01/04	700	12	3	0.00	3.36
OTARD BAY	03/03	04/03	250	30	4	0.40	2.93
OTARD BAY	03/03	04/03	100	50	3	0.50	1.00
OTARD BAY	03/03	04/03	200	20	3	0.30	1.12
OTARD BAY	03/03	04/03	200	30	4	0.20	3.12
OTARD BAY	03/03	04/03	200	50	4	0.30	4.55
OTARD BAY	03/03	04/03	100	20	4	0.33	0.87
PORT CHANAL	24/03	24/03	200	20	4	0.00	2.60
PORT CHANAL	24/03	24/03	2000	25	5	0.00	50.00
PORT CHANAL	24/03	24/03	600	25	5	0.00	15.00
PORT LOUIS	11/03	11/03	300	10	5	0.00	3.00
PORT LOUIS	06/03	08/03	2400	10	4	0.20	12.48
PORT LOUIS	06/03	08/03	2000	10	4	0.25	9.75
PORT LOUIS	06/03	08/03	1600	10	3	0.25	4.80
PORT LOUIS	06/03	08/03	600	8	3	0.20	1.54
PORT LOUIS	06/03	08/03	1000	8	3	0.25	2.40
PORT LOUIS	11/03	11/03	500	5	4	0.00	1.63
PORT LOUIS	06/03	08/03	400	200	3	0.30	22.40
SEAL INLET	08/04	09/04	500	8	4	0.00	2.60
SEAL INLET	08/04	09/04	1000	8	6	0.00	11.20
SEAL INLET	08/04	09/04	600	7	7	0.00	7.98
SEAL INLET	08/04	09/04	200	5	7	0.00	1.90
SEAL INLET	08/04	09/04	600	8	7	0.00	9.12
SEAL INLET	08/04	09/04	500	4	7	0.00	3.80
SHIELDS BAY	26/03	27/03	300	10	6	0.00	4.20
SHIELDS BAY	26/03	27/03	600	25	6	0.00	21.00
SHIELDS BAY	26/03	27/03	700	15	7	0.00	19.95
SHIELDS BAY	26/03	27/03	300	8	5	0.00	2.40
SHIELDS BAY	26/03	27/03	300	8	6	0.00	3.36
SHIELDS BAY	26/03	27/03	700	10	6	0.00	9.80
SHIELDS BAY	26/03	27/03	800	20	5	0.00	16.00
SHIELDS BAY	26/03	27/03	900	10	8	0.00	21.60
AREA TOTAL			37623.				556.08
AREA: 2, EAST COAST Q.C.I.							
ALDER ISLAND	18/03	22/03	900	25	8	0.20	43.20

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 2, EAST COAST Q.C.I. CONTINUED							
ALDER ISLAND	18/03	22/03	180	25	6	0.10	5.67
ALDER ISLAND	18/03	22/03	360	15	5	0.50	2.70
ALDER ISLAND	18/03	22/03	450	15	6	0.05	8.98
ALDER ISLAND	18/03	22/03	450	25	7	0.75	5.34
BEATTIE ANCHORAGE	16/04	17/04	400	5	3	0.00	0.80
BEATTIE ANCHORAGE	21/05	21/05	400	5	4	0.20	1.04
BEATTIE ANCHORAGE	16/04	17/04	700	10	4	0.00	4.55
BIG GOOSE	10/04	10/04	2000	10	5	0.70	6.00
DAVEY ISLETS	05/04	06/04	400	100	3	0.15	13.60
DAVEY ISLETS	05/04	06/04	50	10	3	0.10	0.18
HAIDA POINT	16/04	17/04	60	20	3	0.00	0.48
HAIDA POINT	16/04	17/04	50	5	4	0.00	0.16
HAIDA POINT	16/04	17/04	200	5	4	0.00	0.65
HAIDA POINT	16/04	17/04	40	3	3	0.00	0.05
HUSTON INLET	11/03	16/03	230	5	5	0.05	1.09
HUSTON INLET	11/03	16/03	275	5	5	0.10	1.24
HUSTON INLET	11/03	16/03	32	15	5	0.00	0.48
HUXLEY ISLAND	04/04	04/04	183	27	8	0.10	10.67
HUXLEY ISLAND	27/03	30/03	35	35	7	0.15	1.98
HUXLEY ISLAND	04/04	04/04	320	9	5	0.10	2.59
HUXLEY ISLAND	04/04	04/04	320	23	6	0.20	8.24
HUXLEY ISLAND	04/04	04/04	594	9	3	0.90	0.21
HUXLEY ISLAND	27/03	30/03	940	25	9	0.35	45.83
HUXLEY ISLAND	04/04	04/04	274	18	4	0.25	2.40
HUXLEY ISLAND	27/03	30/03	270	50	6	0.15	16.07
HUXLEY ISLAND	14/03	15/03	30	10	5	0.00	0.30
JEDWAY	09/05	10/05	160	17	6	0.00	3.81
JEDWAY	09/05	10/05	100	10	3	0.10	0.36
KWUNA POINT	04/05	04/05	100	5	4	0.00	0.32
KWUNA POINT	04/05	04/05	120	15	6	0.00	2.52
KWUNA POINT	04/05	04/05	500	15	8	0.00	18.00
LITTLE GOOSE	07/04	08/04	200	3	7	0.00	1.14
LITTLE GOOSE	07/04	08/04	175	35	6	0.00	8.57
LITTLE GOOSE	07/04	08/04	220	12	5	0.05	2.51
LITTLE GOOSE	07/04	08/04	400	6	7	0.15	3.88
LITTLE GOOSE	07/04	08/04	350	30	6	0.00	14.70
LITTLE GOOSE	07/04	08/04	340	16	7	0.00	10.34
LITTLE GOOSE	07/04	08/04	500	17	5	0.00	8.50
LOCKEPORT	14/04	14/04	120	50	4	0.40	2.34
MCLELLAN ISLAND	05/04	06/04	600	20	4	0.00	7.80
MCLELLAN ISLAND	05/04	06/04	600	12	3	0.00	2.88
MCLELLAN ISLAND	05/04	06/04	200	30	4	0.30	2.73
MCLELLAN ISLAND	05/04	06/04	300	4	3	0.00	0.48
MCLELLAN ISLAND	05/04	06/04	200	15	4	0.10	1.75
MCLELLAN ISLAND	05/04	06/04	250	30	3	0.20	2.40

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 2, EAST COAST Q.C.I. CONTINUED							
MCLELLAN ISLAND	05/04	06/04	600	15	2	0.50	0.90
MCLELLAN ISLAND	05/04	06/04	700	150	3	0.40	25.20
MCLELLAN ISLAND	05/04	06/04	130	10	3	0.05	0.49
MCLELLAN ISLAND	05/04	06/04	400	15	3	0.00	2.40
MORESBY CAMP	05/04	06/04	75	10	3	0.05	0.28
MORESBY CAMP	05/04	06/04	30	10	3	0.05	0.11
MORESBY CAMP	05/04	06/04	100	40	3	0.00	1.60
MORESBY CAMP	05/04	06/04	100	15	4	0.10	0.88
MORESBY CAMP	05/04	06/04	50	10	4	0.15	0.28
ONWARD POINT	20/04	20/04	50	10	4	0.25	0.24
PACOFI BAY	10/04	10/04	2000	5	5	0.00	10.00
POOLE INLET	24/03	27/03	234	50	3	0.10	4.21
POOLE INLET	24/03	27/03	180	20	3	0.75	0.36
POOLE INLET	24/03	27/03	630	40	5	0.70	7.56
REBECCA POINT	11/03	16/03	200	150	3	0.00	12.00
REBECCA POINT	11/03	16/03	30	30	2	0.00	0.18
REBECCA POINT	11/03	16/03	400	15	7	0.00	11.40
ROBBER ISLAND	11/05	12/05	30	6	6	0.10	0.23
ROBBER ISLAND	11/05	12/05	40	5	6	0.10	0.25
ROBBER ISLAND	11/05	12/05	15	15	7	0.00	0.43
SAW REEF	18/03	22/03	360	30	6	0.05	14.36
SAW REEF	18/03	22/03	1000	25	6	0.60	14.00
SAW REEF	18/03	22/03	360	5	6	0.30	1.76
SAW REEF	18/03	22/03	720	50	6	0.50	25.20
SAW REEF	18/03	22/03	180	30	6	0.35	4.91
SCUDDER POINT	18/03	23/03	900	15	5	0.10	12.15
SCUDDER POINT	24/03	27/03	3780	20	5	0.70	22.68
SCUDDER POINT	18/03	23/03	7650	45	5	0.25	258.19
SECTION COVE	08/04	08/04	823	40	2	0.35	4.28
SECTION COVE	08/04	08/04	411	9	7	0.15	5.97
SECTION COVE	08/04	08/04	200	2	5	0.50	0.20
SECTION COVE	08/04	08/04	274	9	1	0.30	0.09
SEDGWICK BAY	12/04	12/04	1000	2	6	0.10	2.52
SELWYN INLET	07/04	08/04	210	7	7	0.00	2.79
SELWYN INLET	07/04	08/04	240	30	7	0.00	13.68
SELWYN INLET	07/04	08/04	466	5	6	0.00	3.26
SELWYN INLET	07/04	08/04	400	4	5	0.00	1.60
SELWYN INLET	07/04	08/04	400	5	5	0.00	2.00
SEWELL INLET	05/04	07/04	75	20	3	0.20	0.48
SEWELL INLET	05/04	07/04	250	25	7	0.30	8.31
SEWELL INLET	05/04	07/04	120	23	5	0.00	2.76
SEWELL INLET	05/04	07/04	600	6	6	0.05	4.79
SEWELL INLET	05/04	07/04	110	4	6	0.10	0.55
SEWELL INLET	05/04	07/04	465	15	5	0.05	6.63
SEWELL INLET	05/04	07/04	60	18	5	0.10	0.97

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 2, EAST COAST Q.C.I. CONTINUED							
SEWELL INLET	05/04	07/04	100	5	6	0.00	0.70
SEWELL INLET	05/04	07/04	220	20	5	0.10	3.96
SEWELL INLET	05/04	07/04	260	8	7	0.00	3.95
SEWELL INLET	05/04	07/04	800	20	3	0.30	4.48
SEWELL INLET	05/04	07/04	140	3	5	0.00	0.42
SEWELL INLET	05/04	07/04	270	25	5	0.00	6.75
SEWELL INLET	05/04	07/04	600	6	7	0.00	6.84
SEWELL INLET	05/04	07/04	125	4	4	0.10	0.29
SEWELL INLET	05/04	07/04	300	10	7	0.50	2.85
SEWELL INLET	05/04	07/04	200	20	7	0.00	7.60
SEWELL INLET	05/04	07/04	900	12	7	0.00	20.52
SEWELL INLET	05/04	07/04	140	20	5	0.00	2.80
SEWELL INLET	05/04	07/04	60	10	7	0.00	1.14
SEWELL INLET	05/04	07/04	300	6	6	0.00	2.52
SEWELL INLET	05/04	07/04	200	26	5	0.05	4.94
SEWELL INLET	05/04	07/04	1200	25	5	0.00	30.00
SEWELL INLET	05/04	07/04	400	50	6	0.00	28.00
SEWELL INLET	05/04	07/04	100	30	3	0.25	0.90
SEWELL INLET	05/04	07/04	400	10	6	0.20	4.48
SWAN BAY	01/03	04/03	600	20	7	0.15	19.38
SWAN BAY	01/03	04/03	300	25	4	0.50	2.44
SWAN BAY	01/03	04/03	400	10	4	0.10	2.34
SWAN BAY	01/03	04/03	800	40	9	0.20	76.80
SWAN BAY	01/03	04/03	200	10	6	0.70	0.84
SWAN BAY	01/03	04/03	1000	20	6	0.60	11.20
TREE ISLAND (JEWELL IS.)	05/05	05/05	500	5	5	0.25	1.88
AREA TOTAL			53141.				1020.71
AREA: 3, NASS							
FINLAYSON ISLAND EAST	25/04	02/05	1000	30	4	0.00	19.50
FINLAYSON ISLAND EAST	25/04	02/05	2000	10	2	0.00	4.00
FINLAYSON ISLAND EAST	25/04	02/05	850	30	4	0.00	16.58
FINLAYSON ISLAND EAST	25/04	02/05	650	25	2	0.00	3.25
MARMOT BAY	12/03	12/03	75	5	2	0.20	0.06
MARMOT BAY	07/03	07/03	750	10	3	0.15	2.55
PORTLAND INLET	12/03	12/03	1700	3	3	0.20	1.63
PORTLAND INLET	12/03	12/03	1000	2	3	0.15	0.68
PORTLAND INLET	07/03	12/03	1000	3	2	0.20	0.48

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 3, NASS	CONTINUED						
STEWART MARINA	12/03	12/03	250	4	3	0.20	0.32
AREA TOTAL			9275.				49.05
AREA: 4, SKEENA							
BARRETT ISLAND	31/03	02/04	1600	150	4	0.40	93.60
BIG BAY	27/03	01/04	300	75	5	0.00	22.50
BIG BAY	27/03	01/04	600	200	3	0.20	38.40
BIG BAY	27/03	01/04	3200	200	3	0.00	256.00
BIG BAY	27/03	01/04	200	30	3	0.40	1.44
BIG BAY	27/03	01/04	1500	65	3	0.00	39.00
CREAK ISLANDS	31/03	02/04	100	150	4	0.30	6.82
CREAK ISLANDS	31/03	02/04	100	10	2	0.00	0.20
CREAK ISLANDS	31/03	02/04	300	40	6	0.10	15.12
CREAK ISLANDS	31/03	02/04	200	25	2	0.45	0.55
CREAK ISLANDS	31/03	02/04	50	10	5	0.00	0.50
CREAK ISLANDS	31/03	02/04	850	25	6	0.00	29.75
CREAK ISLANDS	31/03	02/04	1000	150	3	0.60	24.00
CREAK ISLANDS	31/03	02/04	400	50	6	0.00	28.00
CREAK ISLANDS	31/03	02/04	300	200	9	0.00	180.00
CREAK ISLANDS	31/03	02/04	500	75	5	0.25	28.13
CREAK ISLANDS	31/03	02/04	200	100	6	0.20	22.40
CREAK ISLANDS	31/03	02/04	1000	20	6	0.70	8.40
CREAK ISLANDS	31/03	02/04	100	25	5	0.10	2.25
DEVASTATION ISLAND	20/04	22/04	400	20	3	0.25	2.40
DIGBY ISLAND	22/05	23/05	200	100	3	0.00	8.00
DIGBY ISLAND	22/05	23/05	2000	150	3	0.00	120.00
HUNT INLET	14/04	18/04	450	10	5	0.00	4.50
HUNT INLET	14/04	18/04	500	75	6	0.25	39.38
HUNT INLET	14/04	18/04	150	50	7	0.00	14.25
HUNT INLET	31/03	02/04	200	50	2	0.00	2.00
HUNT INLET	14/04	18/04	50	15	4	0.50	0.24
HUNT INLET	31/03	02/04	2000	50	5	0.10	90.00
HUNT INLET	14/04	18/04	300	100	5	0.25	22.50
HUNT INLET	31/03	02/04	2000	10	3	0.00	8.00
HUNT INLET	14/04	18/04	400	25	5	0.00	10.00
JAP POINT	27/03	01/04	1100	150	6	0.00	231.00
MALACCA PASS	17/05	17/05	1000	150	6	0.50	105.00
MCMICKING ISLAND	23/04	27/04	150	10	4	0.00	0.97

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 4, SKEENA	CONTINUED						
MCMICKING ISLAND	01/05	01/05	600	50	3	0.25	9.00
MCMICKING ISLAND	23/04	27/04	150	20	2	0.10	0.54
MCMICKING ISLAND	23/04	27/04	400	20	4	0.00	5.20
MCMICKING ISLAND	23/04	27/04	100	50	4	0.10	2.92
PEARL HARBOUR	27/03	01/04	400	200	4	0.00	52.00
PEARL HARBOUR	27/03	01/04	400	200	3	0.00	32.00
PEARL HARBOUR	27/03	01/04	900	25	4	0.15	12.43
TREE BLUFF	27/03	01/04	800	75	2	0.00	12.00
TREE BLUFF	27/03	01/04	1800	50	3	0.00	36.00
TREE BLUFF	27/03	01/04	3800	75	4	0.20	148.20
AREA TOTAL			32750.				1765.60
AREA: 5, GRENVILLE-PRINCIPE							
CHIEF POINT	25/04	25/04	183	91	5	0.15	14.16
CHIEF POINT	25/04	25/04	457	23	3	0.15	3.57
CHIEF POINT	25/04	25/04	46	46	6	0.10	2.67
CHIEF POINT	25/04	25/04	23	23	4	0.40	0.21
CLAMSHELL ISLAND	08/04	08/04	229	183	5	0.10	37.72
CLAMSHELL ISLAND	08/04	08/04	183	46	4	0.20	4.38
CLAMSHELL ISLAND	08/04	08/04	457	23	4	0.30	4.78
CLAMSHELL ISLAND	08/04	08/04	137	91	4	0.30	5.67
CLAMSHELL ISLAND	08/04	08/04	137	46	4	0.20	3.28
CLAMSHELL ISLAND	08/04	08/04	183	69	4	0.30	5.75
DRIES INLET	14/03	20/03	732	46	5	0.10	30.30
DRIES INLET	14/03	20/03	914	46	6	0.50	29.43
DRIES INLET	14/03	20/03	549	366	5	0.10	180.84
DRIES INLET	14/03	20/03	183	183	4	0.50	10.88
DRIES INLET	14/03	20/03	914	27	4	0.50	8.02
DRIES INLET	14/03	20/03	914	18	2	0.70	0.99
DRIES INLET	14/03	20/03	91	91	2	0.90	0.17
FREEMAN PASSAGE	12/04	15/04	183	183	9	0.30	70.33
FREEMAN PASSAGE	12/04	15/04	183	91	7	0.50	15.82
FREEMAN PASSAGE	15/04	25/04	46	46	2	0.70	0.13
FREEMAN PASSAGE	12/04	15/04	23	23	6	0.60	0.30
FREEMAN PASSAGE	12/04	15/04	69	46	4	0.00	2.06
FREEMAN PASSAGE	12/04	15/04	183	9	6	0.60	0.92
FREEMAN PASSAGE	12/04	15/04	37	37	6	0.60	0.77
FREEMAN PASSAGE	12/04	15/04	91	23	8	0.20	4.02

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 5, GRENVILLE-PRINCIPE CONTINUED							
FREEMAN PASSAGE	15/04	25/04	274	32	7	0.10	14.99
FREEMAN PASSAGE	15/04	25/04	274	5	3	0.00	0.55
FREEMAN PASSAGE	12/04	15/04	274	69	4	0.20	9.83
FREEMAN PASSAGE	15/04	25/04	137	23	9	0.10	8.51
FREEMAN PASSAGE	12/04	15/04	46	23	8	0.30	1.78
GRIFFITH HARBOUR	25/03	28/03	46	9	2	0.75	0.02
GRIFFITH HARBOUR	25/03	28/03	9	9	2	0.50	0.01
KITKATLA INLET	10/04	10/04	69	23	5	0.20	1.27
KITKATLA INLET	10/04	10/04	914	23	2	0.80	0.84
KITKATLA INLET	10/04	10/04	1829	5	3	0.00	3.66
RAWLINSON HARBOUR	25/03	28/03	91	91	6	0.50	5.80
RAWLINSON HARBOUR	25/03	28/03	46	23	6	0.80	0.30
RAWLINSON HARBOUR	25/03	28/03	91	23	7	0.10	3.58
RAWLINSON HARBOUR	25/03	28/03	46	9	6	0.20	0.46
SERPENTINE INLET	07/04	08/04	366	46	5	0.60	6.73
SERPENTINE INLET	07/04	08/04	229	91	4	0.15	11.51
SERPENTINE INLET	07/04	08/04	457	274	4	0.15	69.18
SOLANDER POINT	25/03	28/03	69	23	5	0.10	1.43
SOLANDER POINT	25/03	28/03	46	46	5	0.60	0.85
WILCOX GROUP	02/04	02/04	274	457	4	0.20	65.11
WILCOX GROUP	05/04	07/04	274	274	5	0.20	60.06
WILCOX GROUP	05/04	07/04	91	23	2	0.20	0.33
WILCOX GROUP	05/04	07/04	274	91	5	0.20	19.95
WILCOX GROUP	05/04	07/04	23	9	5	0.10	0.19
WILCOX GROUP	05/04	07/04	366	183	5	0.10	60.28
WILCOX GROUP	05/04	07/04	229	23	3	0.50	1.05
WILCOX GROUP	05/04	07/04	91	46	3	0.70	0.50
WILCOX GROUP	05/04	07/04	91	46	8	0.00	10.05
WILCOX GROUP	05/04	07/04	1006	91	3	0.20	29.29
WILCOX GROUP	05/04	07/04	46	46	5	0.10	1.90
WILCOX GROUP	05/04	07/04	914	23	7	0.20	31.95
WILCOX GROUP	05/04	07/04	46	9	2	0.50	0.04
WILSON INLET	25/04	26/04	91	23	4	0.25	1.02
WILSON INLET	25/04	26/04	91	46	2	0.50	0.42
WILSON INLET	25/04	26/04	46	18	5	0.50	0.41
WILSON INLET	25/04	26/04	183	18	7	0.50	3.13
AREA TOTAL			16596.				864.14
AREA: 6, BUTEDALE							
ARRIAGA ISLAND	19/03	20/03	100	15	4	0.25	0.73

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 6, BUTEDALE	CONTINUED						
ARRIAGA ISLAND	19/03	20/03	400	9	4	0.55	1.05
ARRIAGA ISLAND	20/03	20/03	350	15	5	0.30	3.67
BENT HARBOR	20/03	21/03	100	75	4	0.40	2.93
BENT HARBOR	21/03	22/03	100	4	3	0.50	0.08
BENT HARBOR	21/03	21/03	225	9	5	0.20	1.62
BENT HARBOR	21/03	21/03	250	4	4	0.20	0.52
BENT HARBOR	21/03	22/03	100	9	3	0.30	0.25
BENT HARBOR	20/03	21/03	225	40	3	0.40	2.16
BENT HARBOR	23/03	23/03	400	13	5	0.20	4.16
HAWKESBURY ISLAND	01/06	03/06	457	2	4	0.25	0.45
HAWKESBURY ISLAND	01/06	03/06	46	4	4	0.10	0.11
HAWKESBURY ISLAND	01/06	03/06	549	4	3	0.40	0.53
HAWKESBURY ISLAND	01/06	03/06	366	4	4	0.20	0.76
HAWKESBURY ISLAND	01/06	03/06	183	4	3	0.30	0.20
HAWKESBURY ISLAND	01/06	03/06	640	5	6	0.10	4.03
HAWKESBURY ISLAND	01/06	03/06	183	5	5	0.20	0.73
HAWKESBURY ISLAND	01/06	03/06	274	6	2	0.10	0.30
HAWKESBURY ISLAND	01/06	03/06	366	2	4	0.30	0.33
HAWKESBURY ISLAND	01/06	03/06	457	5	5	0.70	0.69
HAWKESBURY ISLAND	01/06	03/06	229	3	4	0.15	0.38
HAWKESBURY ISLAND	01/06	03/06	457	4	6	0.15	2.18
HAWKESBURY ISLAND	01/06	03/06	229	4	5	0.10	0.82
HAWKESBURY ISLAND	01/06	03/06	1372	4	6	0.10	6.91
HAWKESBURY ISLAND	01/06	03/06	9	3	3	0.25	0.01
HAWKESBURY ISLAND	01/06	03/06	91	3	3	0.25	0.08
HAWKESBURY ISLAND	01/06	03/06	366	2	6	0.10	0.92
HAWKESBURY ISLAND	01/06	03/06	549	3	6	0.10	2.08
HAWKESBURY ISLAND	01/06	03/06	91	3	4	0.25	0.13
HAWKESBURY ISLAND	01/06	03/06	18	6	3	0.10	0.04
HAWKESBURY ISLAND	01/06	03/06	1829	3	4	0.30	2.50
HAWKESBURY ISLAND	01/06	03/06	229	4	3	0.10	0.33
HAWKESBURY ISLAND	01/06	03/06	229	4	4	0.20	0.48
HAWKESBURY ISLAND	01/06	03/06	183	5	1	0.75	0.01
HAWKESBURY ISLAND	01/06	03/06	274	4	6	0.20	1.23
HIGGINS PASSAGE	27/03	27/03	69	9	4	0.25	0.30
HIGGINS PASSAGE	20/03	22/03	400	50	3	0.50	4.00
HIGGINS PASSAGE	26/03	26/03	274	27	9	0.15	18.86
HIGGINS PASSAGE	25/03	25/03	1006	9	5	0.20	7.24
HIGGINS PASSAGE	27/03	27/03	1280	5	5	0.25	4.80
HIGGINS PASSAGE	20/03	22/03	250	50	4	0.30	5.69
HIGGINS PASSAGE	27/03	27/03	183	9	6	0.10	2.08
MEADE POINT	21/03	21/03	600	20	4	0.25	5.85
MEADE POINT	21/03	21/03	100	40	5	0.20	3.20
MEADE POINT	23/03	23/03	125	8	4	0.25	0.49
MEADE POINT	21/03	21/03	200	4	3	0.40	0.19

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 6, BUTEDALE	CONTINUED						
MEADE POINT	21/03	24/03	200	5	4	0.30	0.45
MEADE POINT	22/03	22/03	125	4	3	0.40	0.12
MEADE POINT	22/03	22/03	225	10	4	0.10	1.32
MEADE POINT	22/03	22/03	375	10	5	0.30	2.63
MEADE POINT	21/03	21/03	335	13	4	0.30	1.98
MEADE POINT	20/03	20/03	75	9	3	0.30	0.19
OSMENT INLET	08/03	08/03	90	7	3	0.15	0.21
PARSONS ANCHORAGE	07/03	08/03	1000	10	4	0.50	3.25
PARSONS ANCHORAGE	08/03	11/03	900	30	6	0.30	26.46
PRICE ISLAND	21/03	23/03	500	5	6	0.40	2.10
PRICE ISLAND	21/03	23/03	2700	20	5	0.25	40.50
PRICE ISLAND	21/03	24/03	800	30	6	0.20	26.88
PRICE ISLAND	21/03	23/03	500	30	6	0.40	12.60
PRICE ISLAND	21/03	23/03	650	20	5	0.25	9.75
PRICE ISLAND	21/03	22/03	200	30	3	0.60	0.96
PRICE ISLAND	22/03	22/03	457	5	4	0.15	1.26
PRICE ISLAND	22/03	22/03	457	27	6	0.40	10.36
PRICE ISLAND	21/03	23/03	1000	10	5	0.25	7.50
PRICE ISLAND	22/03	22/03	366	18	5	0.25	4.94
PRICE ISLAND	22/03	22/03	91	18	4	0.20	0.85
PRICE ISLAND	22/03	22/03	2469	18	5	0.25	33.33
PRICE ISLAND	21/03	23/03	20	12	3	0.25	0.07
PRICE ISLAND	21/03	23/03	500	5	4	0.15	1.38
PRICE ISLAND	22/03	22/03	914	9	5	0.25	6.17
PRICE ISLAND	21/03	23/03	250	50	4	0.15	6.91
PRICE ISLAND	21/03	22/03	75	20	5	0.20	1.20
PRICE ISLAND	21/03	25/03	2400	70	7	0.50	159.60
PRICE ISLAND	22/03	22/03	18	11	3	0.25	0.06
PRICE ISLAND	22/03	22/03	137	91	5	0.30	8.73
PRICE ISLAND	22/03	22/03	1463	9	3	0.25	3.95
PRICE ISLAND	22/03	22/03	457	9	6	0.40	3.45
PRICE ISLAND	22/03	22/03	37	5	6	0.10	0.23
PRICE ISLAND	21/03	22/03	500	20	3	0.40	2.40
PRICE ISLAND	22/03	22/03	137	114	6	0.20	17.49
PRICE ISLAND	22/03	22/03	46	46	6	0.20	2.37
PRICE ISLAND	21/03	23/03	400	20	5	0.25	6.00
PRICE ISLAND	21/03	22/03	100	10	4	0.30	0.45
PRICE ISLAND	21/03	24/03	1200	50	7	0.30	79.80
PRICE ISLAND	22/03	22/03	46	27	6	0.20	1.39
PRICE ISLAND	22/03	22/03	594	18	5	0.25	8.02
PRICE ISLAND	22/03	22/03	229	46	4	0.15	5.82
PRICE ISLAND	21/03	23/03	50	51	6	0.20	2.86
PRICE ISLAND	22/03	22/03	64	18	5	0.10	1.04
PRICE ISLAND	21/03	23/03	1600	10	5	0.25	12.00
SWINDLE ISLAND	18/03	18/03	213	3	2	0.25	0.10

Table 13 (contd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 6, BUTEDALE	CONTINUED						
WEETEEAM BAY	20/03	24/03	350	9	4	0.20	1.64
WEETEEAM BAY	24/03	24/03	475	10	3	0.20	1.52
WEETEEAM BAY	21/03	22/03	100	75	4	0.20	3.90
WEETEEAM BAY	18/03	19/03	75	4	3	0.50	0.06
WEETEEAM BAY	19/03	19/03	110	50	4	0.30	2.50
WEETEEAM BAY	20/03	20/03	400	18	5	0.25	5.40
WILBY POINT	23/03	24/03	600	1	4	0.35	0.25
WILBY POINT	24/03	25/03	300	20	5	0.10	5.40
WILBY POINT	23/03	24/03	350	15	5	0.10	4.72
WILBY POINT	23/03	24/03	500	1	4	0.20	0.26
WILBY POINT	23/03	24/03	850	10	5	0.10	7.65
WILBY POINT	24/03	25/03	175	3	3	0.30	0.15
WILBY POINT	19/03	22/03	4637	7	3	0.20	10.39
WILBY POINT	23/03	24/03	200	10	4	0.10	1.17
AREA TOTAL			50500.				660.25
AREA: 7, BELLA BELLA							
BEND PT.	23/03	28/03	411	6	5	0.25	1.85
CULTUS SOUND	28/03	28/03	73	73	7	0.60	4.05
CULTUS SOUND	28/03	28/03	274	3	4	0.30	0.37
CULTUS SOUND	23/03	23/03	229	9	6	0.40	1.73
CULTUS SOUND	28/03	28/03	457	4	5	0.10	1.65
HOUGHTON ISLANDS	21/03	24/03	183	9	8	0.00	3.95
HOUGHTON ISLANDS	21/03	24/03	192	6	7	0.00	2.19
HOUGHTON ISLANDS	21/03	24/03	192	6	5	0.00	1.15
HURRICANE ISLAND	26/03	26/03	823	9	6	0.30	7.26
HURRICANE ISLAND	26/03	26/03	183	3	2	0.70	0.03
HURRICANE ISLAND	26/03	26/03	192	3	2	0.10	0.10
JOASSA CHANNEL	28/03	01/04	91	14	5	0.40	0.76
JOASSA CHANNEL	28/03	01/04	823	137	8	0.00	270.60
JOASSA CHANNEL	28/03	01/04	183	6	7	0.25	1.56
JOASSA CHANNEL	28/03	01/04	137	5	5	0.20	0.55
KING COVE	23/03	28/03	503	18	6	0.20	10.14
LADY TRUTCH PASS	03/04	05/04	322	9	4	0.00	1.88
MCNAUGHTON GROUP	26/03	26/03	27	14	5	0.45	0.21
NORMAN MORRISON BAY	25/03	25/03	549	9	3	0.25	1.48
NORMAN MORRISON BAY	25/03	25/03	55	5	3	0.15	0.09
PORT BLACKNEY	23/03	25/03	274	27	6	0.20	8.29

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 7, BELLA BELLA	CONTINUED						
PORT BLACKNEY	24/03	24/03	366	4	3	0.40	0.35
PORT BLACKNEY	27/03	29/03	91	18	6	0.15	1.95
PORT BLACKNEY	27/03	29/03	1143	18	6	0.10	25.92
PORT BLACKNEY	28/03	29/03	457	3	3	0.25	0.41
PORT BLACKNEY	23/03	25/03	46	37	8	0.20	3.27
PORT BLACKNEY	23/03	25/03	548	18	7	0.15	15.93
PORT BLACKNEY	24/03	24/03	137	9	3	0.30	0.35
PORT BLACKNEY	28/03	29/03	137	3	4	0.10	0.24
SEAFORTH CHANNEL	25/03	02/04	483	137	6	0.05	88.01
SEAFORTH CHANNEL	27/03	04/04	1372	9	6	0.00	17.29
SEAFORTH CHANNEL	25/03	01/04	322	5	5	0.00	1.61
SEAFORTH CHANNEL	22/03	27/03	1448	14	5	0.10	18.24
SEAFORTH CHANNEL	24/03	27/03	161	9	4	0.00	0.94
SEAFORTH CHANNEL	25/03	02/04	483	9	6	0.00	6.09
SPIDER ISLAND	26/03	26/03	91	5	2	0.30	0.06
SPIDER ISLAND	26/03	26/03	549	9	2	0.40	0.59
SPIDER ISLAND	26/03	26/03	183	3	2	0.15	0.09
SPIDER ISLAND	26/03	26/03	549	5	3	0.20	0.88
SPILLER CHANNEL	24/03	24/03	9874	10	6	0.15	117.50
SPILLER CHANNEL	24/03	24/03	1904	3	7	0.75	2.71
SPILLER CHANNEL	24/03	24/03	4442	5	8	0.00	53.30
SPILLER CHANNEL	24/03	24/03	3173	4	6	0.10	15.99
SPILLER CHANNEL	24/03	24/03	916	16	7	0.15	23.67
SPILLER CHANNEL	24/03	24/03	3173	5	7	0.00	30.14
SPILLER CHANNEL	24/03	24/03	1269	3	6	0.00	5.33
SPILLER CHANNEL	24/03	24/03	5394	7	8	0.00	90.62
SPILLER CHANNEL	24/03	24/03	3173	2	7	0.05	11.45
SPILLER CHANNEL	24/03	24/03	3173	1	4	0.50	1.03
SPILLER CHANNEL	24/03	24/03	1586	3	6	0.00	6.66
ST. JOHN HARBOUR	28/03	03/04	549	46	5	0.00	25.25
ST. JOHN HARBOUR	28/03	03/04	91	91	4	0.00	5.38
ST. JOHN HARBOUR	28/03	03/04	274	3	5	0.00	0.82
STRYKER BAY	24/03	27/03	46	9	5	0.05	0.39
STRYKER BAY	27/03	01/04	366	5	3	0.45	0.40
STRYKER BAY	07/03	07/03	274	5	2	0.75	0.07
STRYKER BAY	24/03	24/03	732	9	4	0.05	4.07
STRYKER BAY	27/03	01/04	366	23	5	0.20	6.73
STRYKER BAY	24/03	28/03	183	5	3	0.15	0.31
STRYKER BAY	26/03	29/03	1300	40	5	0.10	46.80
STRYKER BAY	24/03	28/03	366	9	5	0.20	2.64
STRYKER BAY	24/03	27/03	91	9	6	0.00	1.15
THOMPSON BAY	21/03	24/03	594	27	5	0.10	14.43
THOMPSON BAY	21/03	24/03	366	9	4	0.25	1.61
THOMPSON BAY	21/03	24/03	366	27	5	0.15	8.40
THOMPSON BAY (HEAD)	30/03	31/03	91	9	7	0.05	1.48

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 7, BELLA BELLA	CONTINUED						
THOMPSON BAY (HEAD)	30/03	31/03	183	9	5	0.20	1.32
THOMPSON BAY (HEAD)	31/03	31/03	183	5	5	0.10	0.82
THOMPSON BAY (HEAD)	30/03	31/03	137	5	5	0.15	0.58
THOMPSON BAY (HEAD)	31/03	31/03	229	5	6	0.25	1.20
THOMPSON BAY (HEAD)	30/03	31/03	183	5	7	0.05	1.65
THOMPSON BAY (HEAD)	28/03	29/03	183	64	5	0.05	11.13
THOMPSON BAY (HEAD)	30/03	31/03	914	14	7	0.10	21.88
THOMPSON BAY (HEAD)	31/03	31/03	411	9	5	0.15	3.14
THOMPSON BAY (HEAD)	30/03	31/03	731	9	6	0.05	8.75
WASKESIU PASS	25/03	25/03	46	3	3	0.70	0.02
WASKESIU PASS	25/03	25/03	366	91	6	0.40	27.98
AREA TOTAL			62437.				1058.96
AREA: 8, BELLA COOLA							
BURKE CHANNEL	25/05	31/05	27	6	9	0.00	0.49
BURKE CHANNEL	25/05	30/05	1646	3	6	0.00	6.91
BURKE CHANNEL	25/05	31/05	457	2	7	0.00	1.74
BURKE CHANNEL	25/05	30/05	1280	3	3	0.00	1.54
BURKE CHANNEL	25/05	31/05	640	1	4	0.00	0.42
BURKE CHANNEL	25/05	31/05	1646	2	4	0.00	2.14
BURKE CHANNEL	25/05	31/05	457	2	6	0.00	1.28
BURKE CHANNEL	29/05	31/05	2377	2	3	0.00	1.90
BURKE CHANNEL	28/05	31/05	2011	3	4	0.00	3.92
BURKE CHANNEL	25/05	30/05	1829	4	4	0.00	4.76
BURKE CHANNEL	25/05	30/05	1097	2	9	0.00	6.58
BURKE CHANNEL	25/05	31/05	503	1	3	0.00	0.20
FAIRMILE PASSAGE	20/03	24/03	35	15	4	0.30	0.24
FAIRMILE PASSAGE	20/03	24/03	320	50	5	0.40	9.60
FAIRMILE PASSAGE	20/03	24/03	800	15	6	0.10	15.12
FAIRMILE PASSAGE	20/03	24/03	300	1	3	0.20	0.10
FAIRMILE PASSAGE	20/03	24/03	50	50	4	0.00	1.63
FAIRMILE PASSAGE	20/03	24/03	200	35	5	0.00	7.00
FITZ HUGH SOUND	20/03	24/03	110	5	3	0.50	0.11
FITZ HUGH SOUND	20/03	24/03	1320	2	6	0.20	2.96
FITZ HUGH SOUND	20/03	24/03	110	9	6	0.30	0.97
FITZ HUGH SOUND	20/03	24/03	180	5	5	0.20	0.72
FITZ HUGH SOUND	20/03	24/03	25	3	4	0.20	0.04
FITZ HUGH SOUND	20/03	24/03	365	18	4	0.50	2.14

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 8, BELLA COOLA	CONTINUED						
FITZ HUGH SOUND	20/03	24/03	500	3	6	0.20	1.68
ILLAHIE INLET	20/03	24/03	80	9	2	0.50	0.07
ILLAHIE INLET	20/03	24/03	410	5	3	0.70	0.25
ILLAHIE INLET	20/03	24/03	25	10	3	0.30	0.07
KEITH ANCHORAGE	20/03	26/03	45	10	2	0.10	0.08
KEITH ANCHORAGE	20/03	26/03	280	15	6	0.20	4.70
KEITH ANCHORAGE	20/03	26/03	95	8	3	0.15	0.26
KEITH ANCHORAGE	20/03	26/03	170	7	5	0.40	0.71
KEITH ANCHORAGE	20/03	26/03	140	5	6	0.20	0.78
KEITH ANCHORAGE	20/03	26/03	275	25	5	0.40	4.13
KEITH ANCHORAGE	20/03	26/03	280	30	3	0.50	1.68
KEITH ANCHORAGE	20/03	26/03	730	3	2	0.30	0.31
KEITH ANCHORAGE	20/03	26/03	205	5	5	0.25	0.77
KEITH ANCHORAGE	20/03	26/03	375	10	3	0.20	1.20
KEITH ANCHORAGE	20/03	26/03	455	15	4	0.30	3.11
KEITH ANCHORAGE	20/03	26/03	365	25	6	0.10	11.50
KWAKUME INLET	22/03	22/03	140	70	3	0.20	3.14
KWAKUME POINT	21/03	24/03	205	25	2	0.00	1.02
KWAKUME POINT	21/03	24/03	70	45	9	0.10	8.50
KWAKUME POINT	21/03	24/03	25	25	2	0.00	0.13
KWAKUME POINT	21/03	24/03	365	2	3	0.60	0.12
KWAKUME POINT	21/03	24/03	225	3	3	0.30	0.19
NAMU	19/03	23/03	140	45	2	0.20	1.01
NAMU	19/03	23/03	275	45	6	0.20	13.86
NORTH BENTINCK ARM	26/02	28/02	160	1	3	0.20	0.05
NORTH BENTINCK ARM	26/02	28/02	1300	1	2	0.10	0.23
NORTH BENTINCK ARM	26/02	28/02	1800	2	5	0.00	3.60
PRUTH BAY	20/03	26/03	275	10	3	0.20	0.88
PRUTH BAY	20/03	26/03	135	15	5	0.30	1.42
PRUTH BAY	20/03	26/03	180	25	5	0.10	4.05
PRUTH BAY	20/03	26/03	2200	5	4	0.30	5.00
PRUTH BAY	20/03	26/03	600	45	3	0.10	9.72
PRUTH BAY	20/03	26/03	100	15	7	0.10	2.56
PRUTH BAY	20/03	26/03	140	70	5	0.15	8.33
PRUTH BAY	20/03	26/03	15	15	4	0.50	0.07
PRUTH BAY	20/03	26/03	570	5	3	0.25	0.86
AREA TOTAL			31135.				168.52
AREA: 9, RIVERS INLET							
GOOSE BAY	02/04	04/04	350	160	2	0.45	6.16

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 9, RIVERS INLET	CONTINUED						
GOOSE BAY	02/04	04/04	375	125	2	0.45	5.16
AREA TOTAL			725.				11.32
AREA: 10, SMITH INLET							
DRY CREEK	02/04	03/04	200	5	3	0.40	0.24
DRY CREEK	02/04	03/04	110	60	4	0.45	2.36
DRY CREEK	02/04	03/04	240	165	2	0.60	3.17
DRY CREEK	02/04	03/04	385	200	2	0.55	6.93
INDIAN ISLAND	25/03	27/03	750	76	5	0.50	28.50
INDIAN ISLAND	25/03	27/03	200	100	4	0.60	5.20
INDIAN ISLAND	25/03	27/03	400	20	6	0.50	5.60
MCBRIDE BAY	15/04	16/04	325	18	3	0.20	1.87
MCBRIDE BAY	15/04	16/04	200	10	2	0.70	0.12
MCBRIDE BAY	15/04	16/04	480	3	2	0.40	0.17
MCBRIDE BAY	15/04	16/04	125	3	2	0.30	0.05
AREA TOTAL			3415.				54.21
AREA: 11, SEYMOUR-BELIZE							
NUGENT SOUND	21/03	21/03	1700	1	6	0.25	1.79
SEYMOUR INLET	19/04	19/04	4000	1	3	0.25	1.20
AREA TOTAL			5700.				2.99
AREA: 12, ALERT BAY							
AXE POINT	13/03	13/03	4400	4	4	0.20	9.15

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE START	SPAWNED END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 12, ALERT BAY	**CONTINUED**						
CASCADE POINT	22/03	22/03	50	2	5	0.10	0.09
DEER BAY	17/03	17/03	450	2	5	0.10	0.81
FALSE HEAD	24/03	24/03	805	8	5	0.25	4.83
GLACIER BAY +	22/03	22/03	6300	2	5	0.35	8.19
KNIGHT INLET (HEAD)	14/03	14/03	5300	2	4	0.15	5.86
KNIGHT INLET (HEAD)	15/03	15/03	5000	3	4	0.20	7.80
KNIGHT INLET (HEAD)	13/03	13/03	4000	3	5	0.10	10.80
RUBBLE POINT	17/03	17/03	300	15	5	0.10	4.05
WAHKASH CREEK	17/03	17/03	400	8	4	0.25	1.56
WAKEMAN SOUND	21/03	21/03	650	3	4	0.20	1.01
WAKEMAN SOUND	21/03	21/03	25	12	4	0.00	0.19
WAKEMAN SOUND	31/03	31/03	150	2	5	0.20	0.24
WAKEMAN SOUND	21/03	21/03	550	3	2	0.20	0.26
WAKEMAN SOUND	06/04	06/04	2300	4	6	0.05	12.24
WAKEMAN SOUND	05/04	06/04	185	2	2	0.40	0.04
WAKEMAN SOUND	21/03	21/03	100	9	3	0.50	0.18
WAKEMAN SOUND	21/03	21/03	150	2	3	0.20	0.10
WAKEMAN SOUND	21/03	21/03	2000	2	2	0.30	0.56
WAKEMAN SOUND	21/03	21/03	60	3	4	0.50	0.06
WAKEMAN SOUND	21/03	21/03	25	2	2	0.70	0.00
WAKEMAN SOUND	05/04	06/04	1500	3	3	0.35	1.17
WAKEMAN SOUND	22/03	22/03	1250	2	3	0.25	0.75
WAKEMAN SOUND	21/03	21/03	100	6	3	0.20	0.19
WAKEMAN SOUND	05/04	06/04	400	3	2	0.40	0.14
WAKEMAN SOUND	21/03	21/03	5	22	2	0.95	0.00
WAKEMAN SOUND	21/03	21/03	650	1	4	0.25	0.32
WAKEMAN SOUND	31/03	05/04	250	5	3	0.20	0.40
WAKEMAN SOUND	21/03	21/03	800	1	3	0.20	0.26
WAKEMAN SOUND	31/03	05/04	400	3	4	0.25	0.58
WAKEMAN SOUND	21/03	21/03	100	3	2	0.50	0.03
WAKEMAN SOUND	21/03	21/03	450	2	3	0.20	0.29
AREA TOTAL			39105.				72.16
AREA: 13, QUATHIASKI							
CAPE MUDGE	29/03	29/03	4822	80	5	0.40	231.46
DEEPWATER BAY	11/04	14/04	1760	20	7	0.60	26.75
DISCOVERY PASS	08/04	08/04	75	10	6	0.10	0.94
FRANCISCO POINT	15/03	15/03	50	15	4	0.10	0.44

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 13, QUATHIASKI	CONTINUED						
FRANCISCO POINT	15/03	19/03	600	100	8	0.45	79.20
FRANCISCO POINT	11/03	13/03	1200	40	5	0.20	38.40
FRANCISCO POINT	13/03	15/03	200	25	4	0.30	2.27
FRASER BAY	28/03	28/03	600	2	2	0.60	0.10
FRASER BAY	29/03	29/03	100	3	3	0.40	0.07
FRASER BAY	29/03	29/03	100	2	2	0.10	0.04
HAMILTON PT.	19/03	20/03	4400	3	2	0.10	2.38
MCBRIDE BAY	29/03	29/03	50	2	3	0.30	0.03
MCBRIDE BAY	29/03	29/03	125	3	3	0.20	0.12
MCBRIDE BAY	29/03	29/03	150	4	5	0.30	0.42
PURCELL PT.	20/03	20/03	2600	3	7	0.10	13.34
REBECCA SPIT	18/03	20/03	300	20	7	0.10	10.26
REBECCA SPIT	16/03	20/03	3500	50	8	0.50	210.00
SOUTHGATE RIVER	19/03	19/03	1760	3	2	0.10	0.95
AREA TOTAL			22392.				617.16
AREA: 14, COMOX							
CAPE LAZO	28/02	02/03	1350	25	3	0.80	2.70
DENMAN ISLAND (EAST)	04/03	04/03	2600	25	5	0.80	13.00
DENMAN ISLAND (EAST)	04/03	04/03	1400	15	4	0.99	0.14
DENMAN ISLAND (EAST)	28/02	28/02	3800	40	6	0.35	138.32
DENMAN ISLAND (WEST)	04/03	04/03	500	25	7	0.80	4.75
EAGLE CREST	15/03	15/03	1000	300	6	0.80	84.00
EAGLE CREST	15/03	15/03	600	150	6	0.80	25.20
FILLONGLEY PARK	27/02	27/02	3300	600	7	0.50	1881.00
FILLONGLEY PARK	27/02	27/02	2400	100	4	0.50	78.00
FRENCH CREEK	15/03	15/03	1500	100	6	0.80	42.00
KOMAS BLUFF	27/02	04/03	800	125	7	0.40	114.00
KOMAS BLUFF	27/02	04/03	1500	60	7	0.25	128.25
KOMAS BLUFF	27/02	04/03	800	50	7	0.50	38.00
KOMAS BLUFF	27/02	04/03	1400	70	7	0.50	93.10
KYE BAY	28/02	02/03	600	10	4	0.50	1.95
NILE CREEK	19/03	20/03	1250	100	4	0.40	48.75
NORMAN POINT	18/03	18/03	400	25	4	0.75	1.63
NORMAN POINT	14/03	14/03	1000	25	5	0.35	16.25
NUTTAL BAY	25/02	27/02	2300	50	5	0.20	92.00
OYSTER BAY	26/03	26/03	350	50	4	0.15	9.67
PARKSVILLE BAY	14/03	14/03	2000	200	6	0.20	448.00

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 14, COMOX	CONTINUED						
SEAL ISLETS	04/03	04/03	750	10	3	0.95	0.15
SHINGLE SPIT	14/03	14/03	1000	20	4	0.40	7.80
SHINGLE SPIT	14/03	14/03	1700	25	7	0.50	40.38
SHINGLE SPIT	14/03	14/03	400	10	5	0.30	2.80
SHINGLE SPIT	14/03	14/03	1400	25	5	0.60	14.00
AREA TOTAL			36100.				3325.83
AREA: 15, WESTVIEW							
ATREVIDA REEF	21/03	22/03	100	10	6	0.35	0.91
ATREVIDA REEF	21/03	22/03	137	10	2	0.30	0.19
ATREVIDA REEF	21/03	22/03	183	18	4	0.25	1.61
HARWOOD ISLAND	11/03	12/03	274	14	3	0.70	0.46
HARWOOD ISLAND	11/03	12/03	2012	137	6	0.25	289.43
HARWOOD ISLAND	11/03	12/03	549	37	5	0.20	16.25
HARWOOD ISLAND	11/03	12/03	274	45	2	0.20	1.97
HARWOOD ISLAND	11/03	12/03	366	64	4	0.40	9.14
SCUTTLE BAY	12/03	13/03	1463	100	5	0.20	117.04
SCUTTLE BAY	12/03	13/03	549	183	5	0.00	100.47
AREA TOTAL			5907.				537.46
AREA: 17, NANAIMO							
BLUNDEN POINT	02/03	09/03	100	60	4	0.20	3.12
BOAT HARBOUR	01/03	06/03	1500	200	5	0.05	285.00
COFFIN POINT (IS.)	01/03	06/03	1000	200	7	0.00	380.00
COFFIN POINT (IS.)	01/03	06/03	3000	175	5	0.00	525.00
COFFIN POINT (IS.)	01/03	06/03	300	30	6	0.00	12.60
COFFIN POINT (IS.)	01/03	06/03	250	75	6	0.05	24.94
COFFIN POINT (IS.)	01/03	06/03	400	20	6	0.00	11.20
FRASER POINT	10/03	12/03	5000	20	7	0.00	190.00
ICARUS POINT	02/03	09/03	150	100	4	0.20	7.80
ICARUS POINT	02/03	09/03	30	20	2	0.80	0.02

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 17, NANAIMO	CONTINUED						
NANOOSE BAY	02/03	09/03	100	150	5	0.50	7.50
NANOOSE BAY	02/03	09/03	500	50	4	0.05	15.44
NANOOSE BAY	02/03	09/03	150	40	5	0.40	3.60
NANOOSE BAY	02/03	09/03	200	50	4	0.40	3.90
NANOOSE BAY	02/03	09/03	600	300	3	0.20	57.60
PREEDY HARBOUR	10/03	12/03	600	25	5	0.50	7.50
PREEDY HARBOUR	10/03	12/03	1300	35	4	0.00	29.57
PREEDY HARBOUR	10/03	12/03	2500	40	7	0.00	190.00
YELLOW POINT	01/03	06/03	500	30	2	0.20	2.40
YELLOW POINT	01/03	06/03	1000	60	4	0.05	37.05
YELLOW POINT	01/03	06/03	550	75	4	0.05	25.47
AREA TOTAL			19730.				1819.72
AREA: 18, COWICHAN							
ANNETTE INLET	23/03	23/03	200	50	5	0.25	7.50
AREA TOTAL			200.				7.50
AREA: 23, BARKLEY SOUND							
MAGGIE RIVER	06/03	06/03	50	20	4	0.50	0.32
MAGGIE RIVER	06/03	06/03	550	40	3	0.80	1.76
MAGGIE RIVER	06/03	06/03	500	50	6	0.20	28.00
MAGGIE RIVER	06/03	06/03	375	40	4	0.50	4.88
MAGGIE RIVER	06/03	06/03	500	50	2	0.90	0.50
MAGGIE RIVER	06/03	06/03	250	50	5	0.20	10.00
MAGGIE RIVER	06/03	06/03	1400	275	5	0.40	231.00
SPRING COVE	23/03	23/03	180	3	3	0.50	0.11
SPRING COVE	20/03	22/03	260	60	6	0.20	17.47
SPRING COVE	20/03	22/03	670	50	6	0.20	37.52
TWO RIVERS +	06/03	16/03	450	110	2	0.30	6.93
TWO RIVERS +	06/03	16/03	720	100	4	0.30	32.76
TWO RIVERS +	06/03	06/03	240	60	6	0.20	16.13

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 23, BARKLEY SOUND	CONTINUED						
TWO RIVERS +	06/03	16/03	490	115	4	0.30	25.64
TWO RIVERS +	16/03	16/03	530	100	5	0.10	47.70
TWO RIVERS +	16/03	16/03	440	100	3	0.70	5.28
TWO RIVERS +	06/03	06/03	430	220	5	0.60	37.84
TWO RIVERS +	06/03	06/03	640	45	6	0.30	28.22
TWO RIVERS +	06/03	16/03	320	90	2	0.30	4.03
TWO RIVERS +	16/03	16/03	600	150	2	0.70	5.40
UCLUELET	21/03	23/03	500	100	7	0.30	66.50
UCLUELET	20/03	20/03	270	5	5	0.10	1.22
UCLUELET	20/03	20/03	180	60	3	0.70	1.30
UCLUELET	21/03	21/03	220	60	7	0.30	17.56
UCLUELET	23/03	23/03	125	125	5	0.50	7.81
UCLUELET	20/03	20/03	200	5	2	0.20	0.16
UCLUELET	20/03	21/03	410	40	5	0.40	9.84
UCLUELET	23/03	23/03	100	50	5	0.90	0.50
UCLUELET	23/03	23/03	150	50	9	0.40	13.50
UCLUELET	21/03	23/03	250	60	8	0.20	28.80
UCLUELET	21/03	23/03	520	120	6	0.50	43.68
UCLUELET	23/03	23/03	300	10	7	0.10	5.13
UCLUELET	20/03	22/03	430	50	6	0.40	18.06
UCLUELET	20/03	22/03	625	75	9	0.10	126.56
UCLUELET	23/03	23/03	200	125	9	0.40	45.00
UCLUELET	20/03	20/03	100	4	7	0.50	0.38
UCLUELET	23/03	23/03	330	5	3	0.10	0.59
UCLUELET	20/03	20/03	180	10	1	0.70	0.03
AREA TOTAL			14685.				928.11
AREA: 24, CLAYOQUOT SOUND							
BAWDEN BAY	30/03	30/03	46	7	3	0.00	0.13
ELBOW BANK	20/03	20/03	183	137	2	0.60	2.01
EPPER PASS	20/03	20/03	91	1	3	0.00	0.04
EPPER PASS	20/03	20/03	229	114	7	0.00	49.60
EPPER PASS	20/03	20/03	14	4	4	0.00	0.04
EPPER PASS	20/03	20/03	366	64	7	0.00	44.51
EPPER PASS	20/03	20/03	137	18	4	0.00	1.60
EPPER PASS	20/03	20/03	137	3	5	0.00	0.41
HOT SPRINGS COVE	10/03	21/03	73	9	6	0.00	0.92
HOT SPRINGS COVE	10/03	21/03	27	2	7	0.00	0.10

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 24, CLAYOQUOT SOUND CONTINUED							
HOT SPRINGS COVE	10/03	21/03	183	64	7	0.00	22.25
HOT SPRINGS COVE	10/03	21/03	46	4	7	0.00	0.35
HOT SPRINGS COVE	10/03	21/03	114	3	5	0.00	0.34
HOT SPRINGS COVE	10/03	21/03	11	7	9	0.00	0.23
HOT SPRINGS COVE	10/03	21/03	23	9	4	0.00	0.13
HOT SPRINGS COVE	10/03	21/03	9	9	6	0.10	1.03
HOT SPRINGS COVE	10/03	21/03	274	5	6	0.10	1.73
HOT SPRINGS COVE	10/03	21/03	23	9	7	0.00	0.39
HOT SPRINGS COVE	10/03	21/03	14	7	6	0.00	0.14
HOT SPRINGS COVE	10/03	21/03	46	4	3	0.50	0.04
HOT SPRINGS COVE	10/03	21/03	114	7	6	0.00	1.12
HOT SPRINGS COVE	10/03	21/03	183	2	3	0.20	0.12
HOT SPRINGS COVE	10/03	21/03	64	4	7	0.00	0.49
HOT SPRINGS COVE	10/03	21/03	18	4	8	0.00	0.17
HOT SPRINGS COVE	10/03	21/03	183	2	7	0.15	0.59
HOT SPRINGS COVE	10/03	21/03	23	4	8	0.00	0.22
HOT SPRINGS COVE	10/03	21/03	7	7	4	0.00	0.03
HOT SPRINGS COVE	10/03	21/03	274	5	8	0.00	3.29
HOT SPRINGS COVE	10/03	21/03	14	2	5	0.00	0.03
HOT SPRINGS COVE	10/03	21/03	37	5	7	0.00	0.35
HOT SPRINGS COVE	10/03	21/03	91	7	7	0.10	1.09
HOT SPRINGS COVE	10/03	21/03	320	5	8	0.00	3.84
HOT SPRINGS COVE	10/03	21/03	18	3	6	0.00	0.08
HOT SPRINGS COVE	10/03	21/03	9	9	7	0.00	0.15
HOT SPRINGS COVE	10/03	21/03	18	5	7	0.00	0.17
KRAAN ISLAND	20/03	20/03	91	2	7	0.00	0.35
KRAAN ISLAND	20/03	20/03	64	18	5	0.10	1.04
KRAAN ISLAND	20/03	20/03	23	9	6	0.00	0.29
KRAAN ISLAND	20/03	20/03	27	18	5	0.00	0.49
MATILDA INLET	20/03	20/03	18	2	3	0.00	0.01
MATILDA INLET	20/03	20/03	91	46	2	0.20	0.67
MCINTOSH BAY	20/03	20/03	183	64	4	0.00	7.61
OPITSAT RESERVE	16/03	16/03	183	37	4	0.25	3.30
OPITSAT RESERVE	16/03	16/03	91	46	7	0.40	4.77
ROBERT POINT	20/03	20/03	137	91	6	0.25	13.09
ROBERT POINT	20/03	20/03	18	9	4	0.00	0.11
STOCKHAM ISLAND	16/03	16/03	137	14	4	0.00	1.25
STOCKHAM ISLAND	16/03	16/03	91	9	3	0.00	0.33
STUBBS ISLAND	18/03	18/03	457	137	2	0.25	9.39
YELLOW BANK	20/03	20/03	137	69	2	0.50	0.95
AREA TOTAL			5249.				181.36

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 25, NOOTKA SOUND							
NUCHATLITZ VILLAGE	02/03	08/03	220	110	3	0.00	9.68
NUCHATLITZ VILLAGE	03/03	08/03	220	110	2	0.10	4.36
NUCHATLITZ VILLAGE	03/03	08/03	50	50	3	0.00	1.00
NUCHATLITZ VILLAGE	03/03	08/03	180	20	4	0.00	2.34
NUCHATLITZ VILLAGE	02/03	08/03	280	130	6	0.50	25.48
NUCHATLITZ VILLAGE	03/03	08/03	280	160	3	0.00	17.92
NUCHATLITZ VILLAGE	01/03	08/03	630	200	4	0.10	73.71
NUCHATLITZ VILLAGE	02/03	08/03	300	200	3	0.10	21.60
NUCHATLITZ VILLAGE	03/03	08/03	100	50	7	0.20	7.60
NUCHATLITZ VILLAGE	03/03	08/03	470	230	4	0.30	49.19
NUCHATLITZ VILLAGE	02/03	08/03	290	160	5	0.10	41.76
NUCHATLITZ VILLAGE	02/03	08/03	400	220	5	0.00	88.00
NUCHATLITZ VILLAGE	03/03	08/03	330	50	3	0.00	6.60
NUCHATLITZ VILLAGE	03/03	08/03	100	80	4	0.00	5.20
NUCHATLITZ VILLAGE	01/03	08/03	400	180	4	0.30	32.76
OUTER NUCHATLITZ	03/03	08/03	140	50	4	0.30	3.19
OUTER NUCHATLITZ	03/03	08/03	270	130	2	0.30	4.91
OUTER NUCHATLITZ	03/03	08/03	270	180	4	0.50	15.79
OUTER NUCHATLITZ	03/03	08/03	330	150	4	0.40	19.31
OUTER NUCHATLITZ	03/03	08/03	250	130	7	0.30	43.22
OUTER NUCHATLITZ	03/03	08/03	160	50	3	0.40	1.92
OUTER NUCHATLITZ	03/03	08/03	290	150	4	0.30	19.79
OUTER NUCHATLITZ	03/03	08/03	180	70	3	0.40	3.02
OUTER NUCHATLITZ	03/03	08/03	220	130	4	0.30	13.01
PORT LANGFORD	03/03	08/03	100	60	9	0.80	3.60
PORT LANGFORD	03/03	08/03	1250	20	4	0.00	16.25
PORT LANGFORD	03/03	08/03	300	120	3	0.20	11.52
PORT LANGFORD	03/03	08/03	380	20	2	0.00	1.52
PORT LANGFORD	03/03	08/03	260	100	4	0.00	16.90
AREA TOTAL			8650.				561.16
AREA: 27, QUATSINO SOUND							
BROWNING INLET	08/03	08/03	183	23	4	0.00	2.74

Table 13 (cont'd). HERRING SPAWNING SUMMARY TABLE FOR 1983.

SPAWNING GROUND	DATE SPAWNED START	END	LENGTH M.	WIDTH M.	CALCULATED INTENSITY	EST. BARE AREA	STD.SQ. M. (1000'S)
AREA: 27, QUATSINO SOUND	CONTINUED						
DENAD CREEK	02/03	02/03	1097	274	6	0.10	378.73
FLINT ROCK	06/03	06/03	366	46	5	0.40	10.10
GALATO CREEK	03/03	03/03	457	366	6	0.10	210.75
GREENWOOD POINT	06/03	06/03	274	46	5	0.10	11.34
HALL BANK	04/03	04/03	457	91	6	0.50	29.11
HAZARD POINT	05/03	08/03	549	91	7	0.20	75.94
HAZARD POINT	08/03	08/03	549	46	6	0.20	28.28
HAZARD POINT	08/03	08/03	366	46	5	0.30	11.79
HUNT ISLETS	08/03	08/03	11	46	5	0.10	0.46
MATHEWS ISLAND	09/03	09/03	366	46	5	0.20	13.47
MOORES ISLAND	28/02	28/02	274	46	5	0.10	11.34
MOORES ISLAND	01/03	01/03	640	91	5	0.30	40.77
QUASHTIN CREEK	05/03	05/03	549	46	4	0.20	13.13
WEDEL ISLAND	04/03	04/03	1006	137	6	0.10	173.66
WEDEL ISLAND	02/03	02/03	229	183	5	0.10	37.72
WEDEL ISLAND	02/03	02/03	366	229	7	0.00	159.25
WEDEL ISLAND	03/03	03/03	823	91	6	0.00	104.85
WINTER HARBOUR	27/02	07/03	732	91	6	0.30	65.28
AREA TOTAL			9294.				1378.69

ACKNOWLEDGEMENTS

The authors wish to thank Lloyd Webb and Bob Armstrong for critically reviewing the manuscript, Valerie Rogers and the staff of the SEP Information/ Processing Center for typing the drafts, and Alice Fedorenko for drafting the figures and preparing the manuscript for publication.

REFERENCES

Haegele, C.W. and M.J. Hamey. 1979. Shoreline vegetation on herring spawning grounds in Clayoquot Sound. Fish. Mar. Serv. MS. Rep. 1536:39 p.

Haegele, C.W., A.S. Hourston, R.D. Humphreys and D.C. Miller. 1979. Eggs per unit area in British Columbia herring spawn depositions. Fish. Mar. Serv. Tech. Rep. 894:30 p.

Shields, T.L. and G. Kingston. 1982. Herring impoundment and spawn on kelp production in British Columbia. Archipelago Marine Research. Rep. submitted to DFO Pacific Region:57 p.

Shields, T.L. and J. Watson. 1983. Spawn on kelp production using open ponds in Queen Charlotte Islands. Archipelago Marine Research. Rep. submitted to DFO Pacific Region:46 p.

Stocker, M., V. Haist and D. Fournier. 1983. Stock assessments for British Columbia herring in 1982 and forecasts of the potential catch in 1983. Can. Tech. Rep. Fish. Aquat. Sci. 1158:53 p.

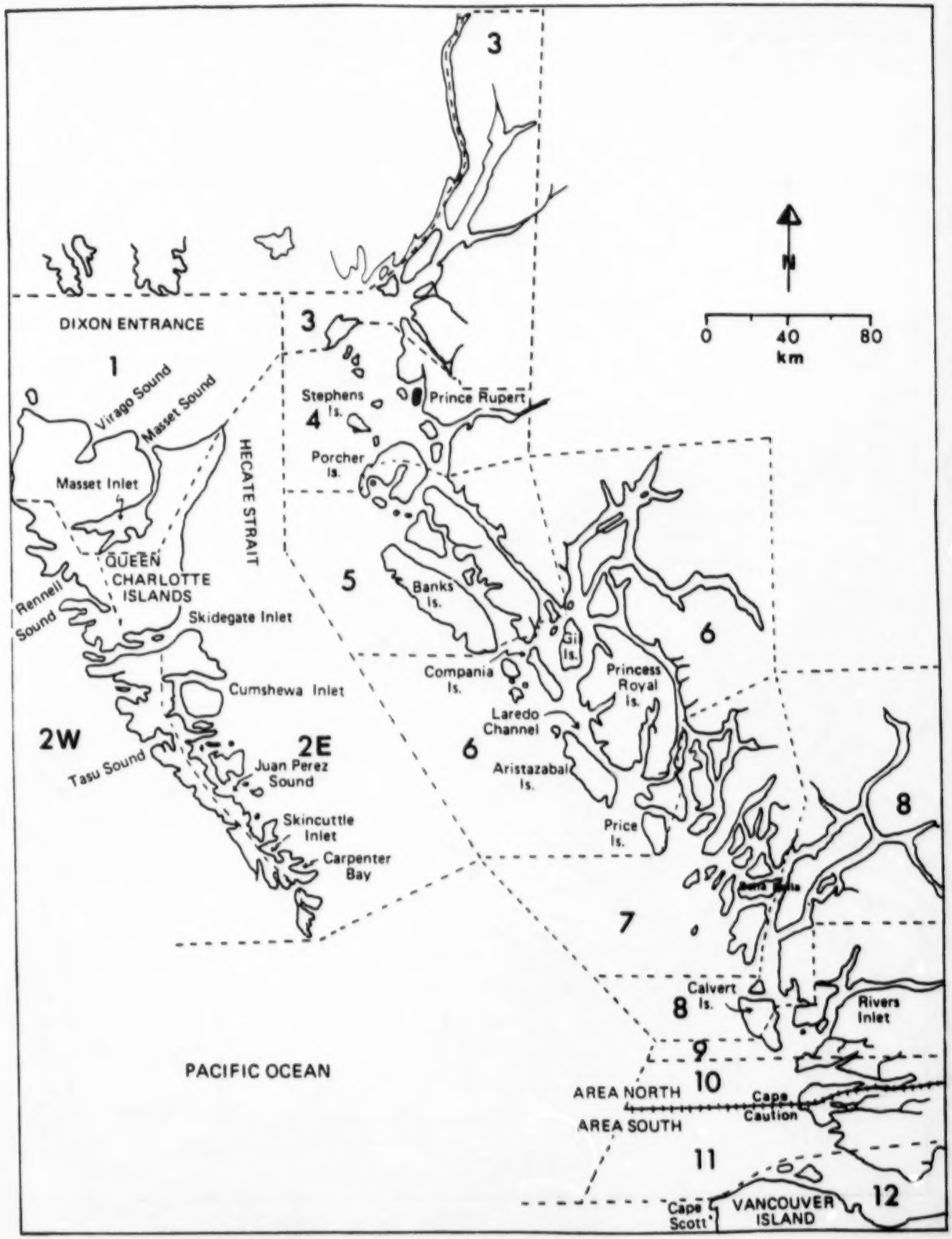

Fig. 1. Location of Statistical Areas in northern B.C.

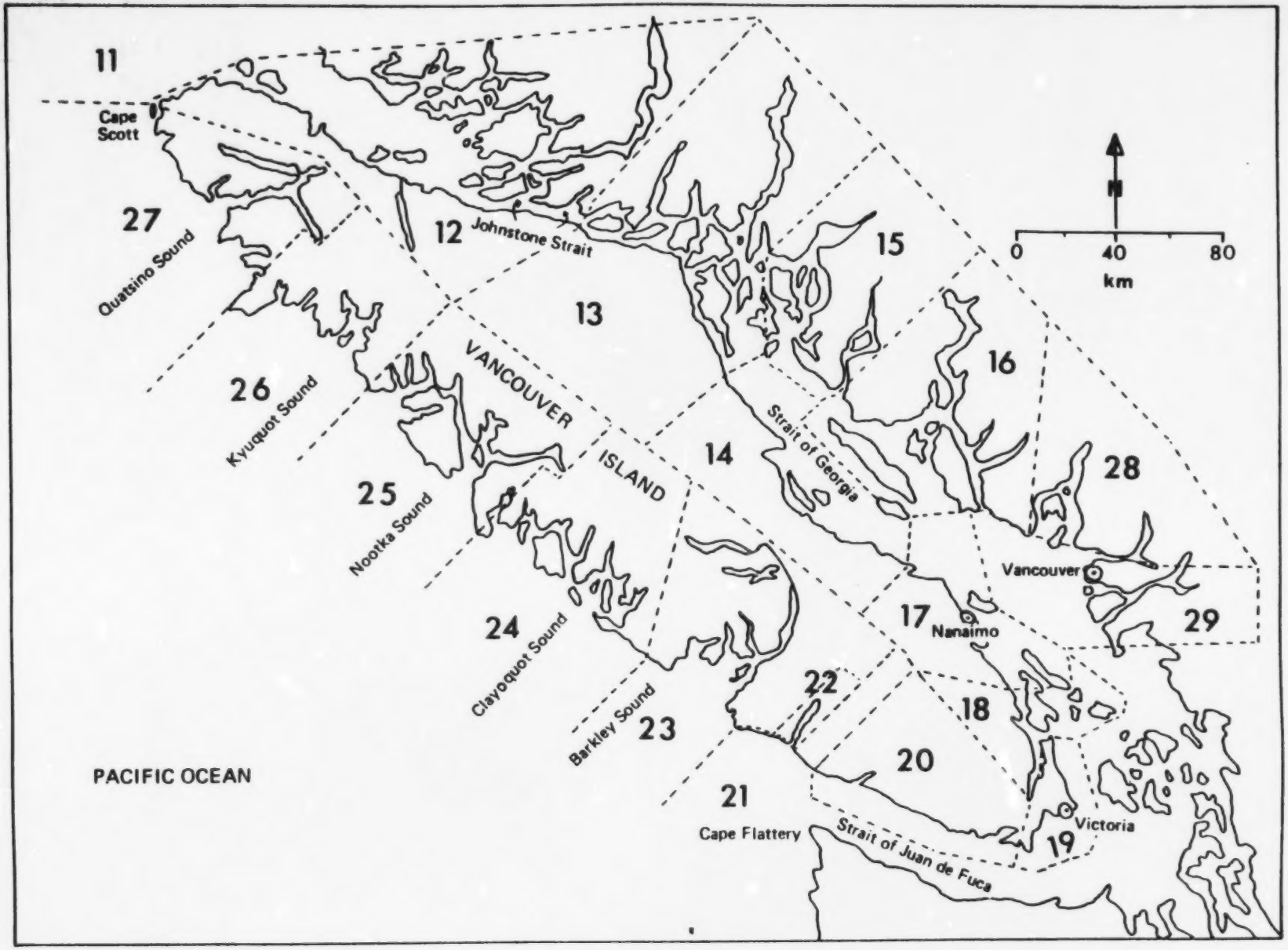

Fig. 2. Location of Statistical Areas in southern B.C.

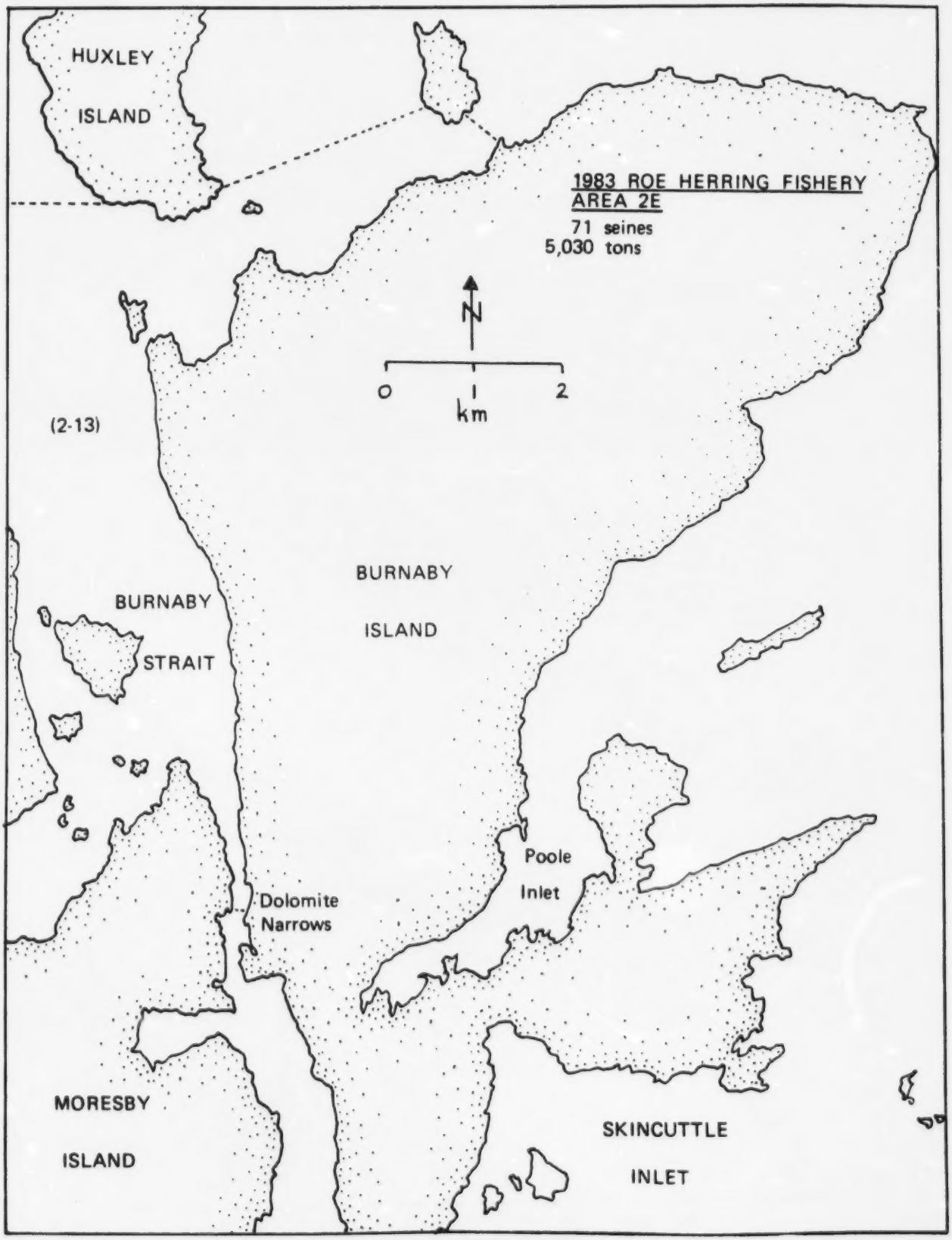

Fig. 3a. Roe herring fishing boundaries and hailed seine catches in Area 2E, Burnaby Strait, 1983.

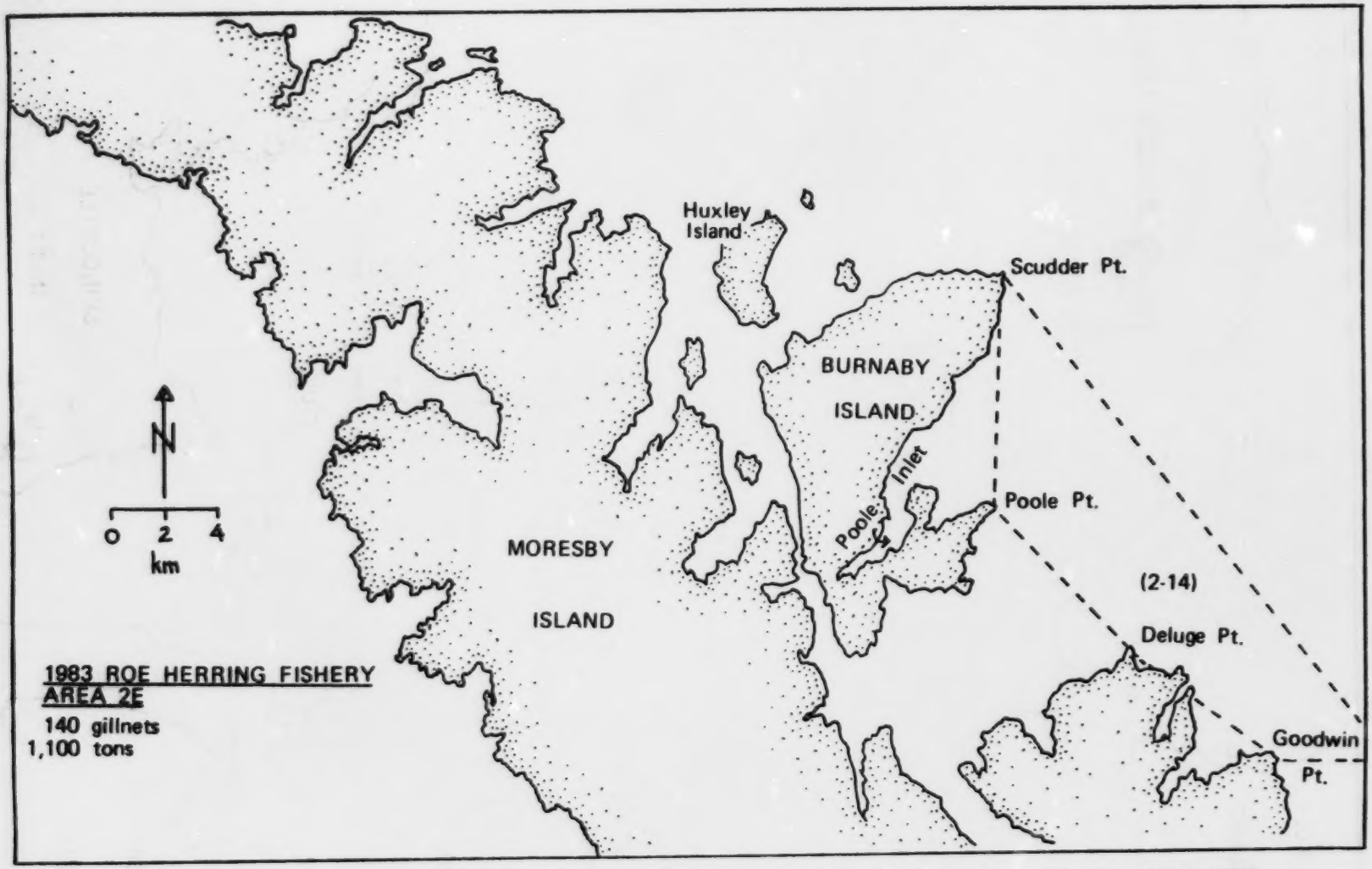

Fig. 3b. Roe herring fishing boundaries and hailed gillnet catches in Area 2E, Poole Inlet - Skincuttle Inlet, 1983.

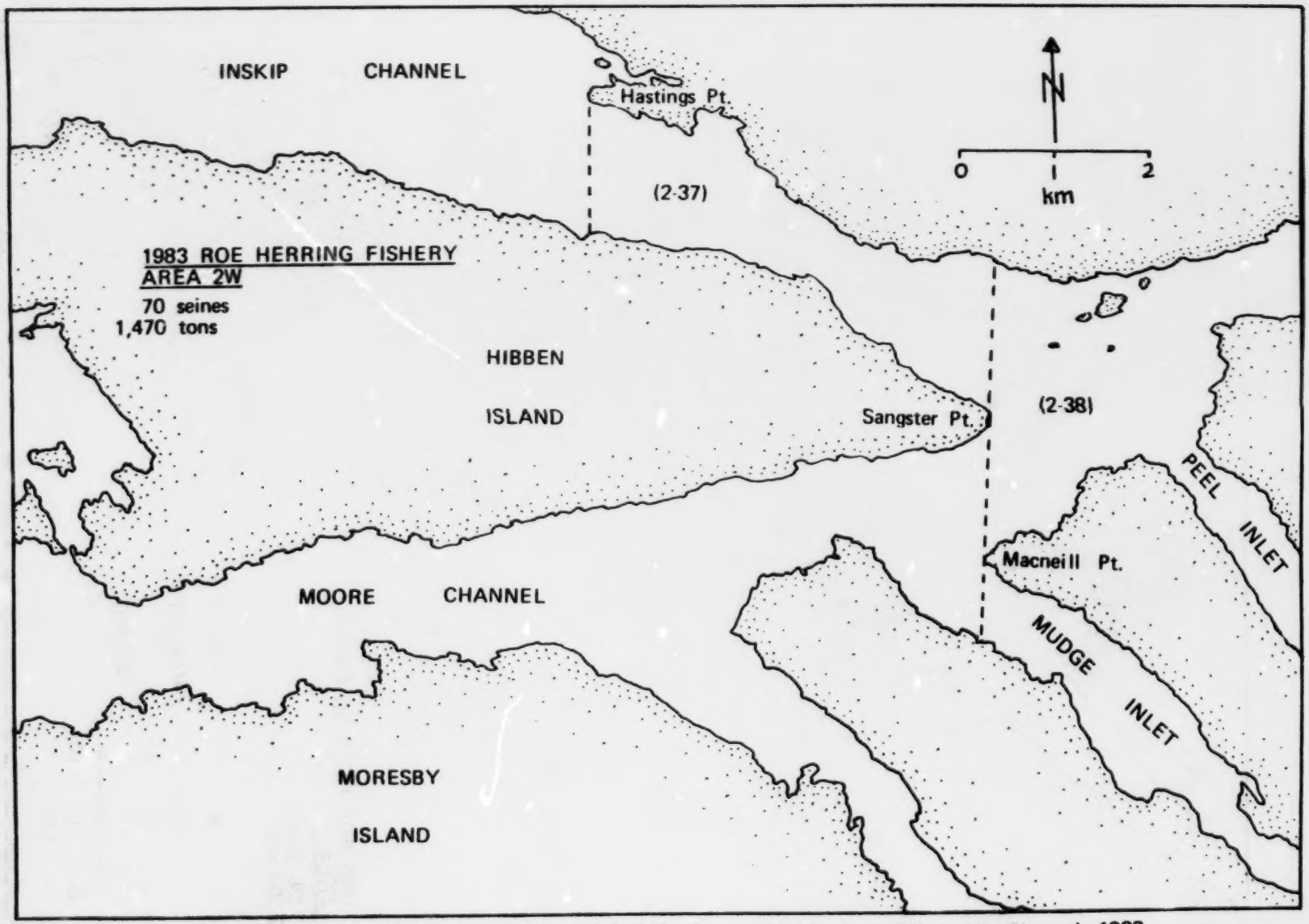

Fig. 3c. Roe herring fishing boundaries and hailed seine catches in Area 2W, Inskip Channel, 1983.

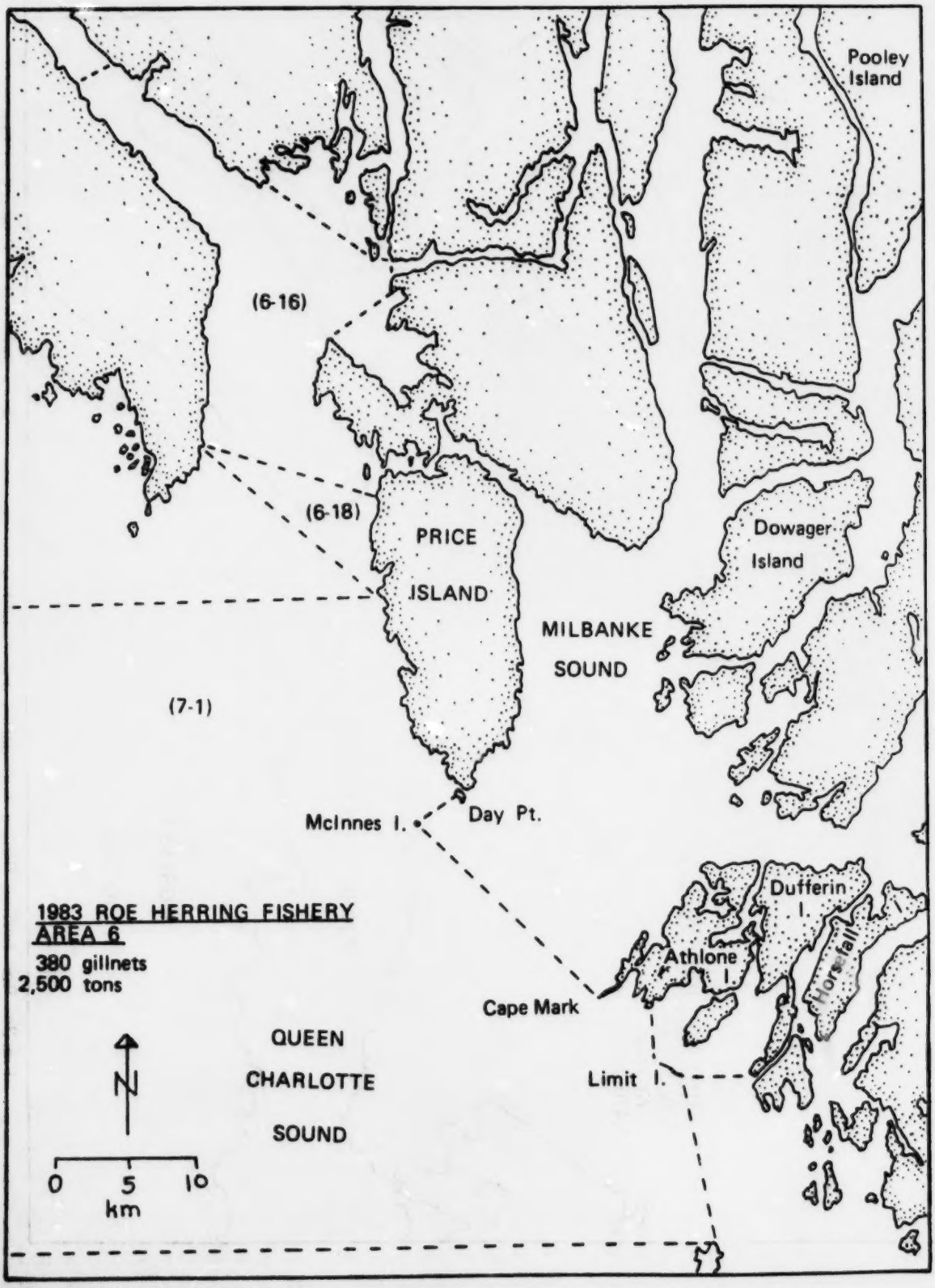

Fig. 3d. Roe herring fishing boundaries and hailed gillnet catches in Area 6, Price Island - Milbanke Sound, 1983.

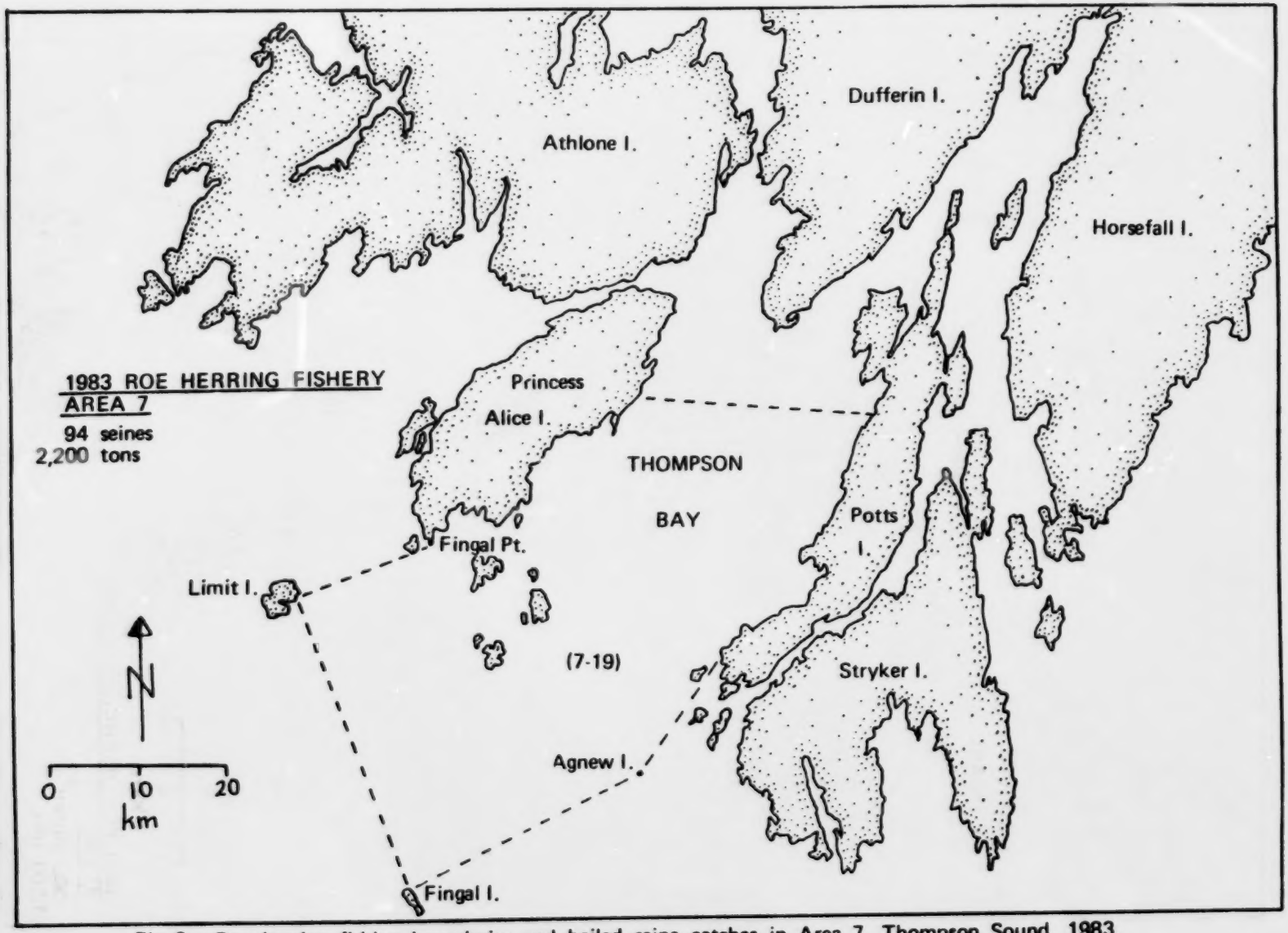

Fig. 3e. Roe herring fishing boundaries and hailed seine catches in Area 7, Thompson Sound, 1983.

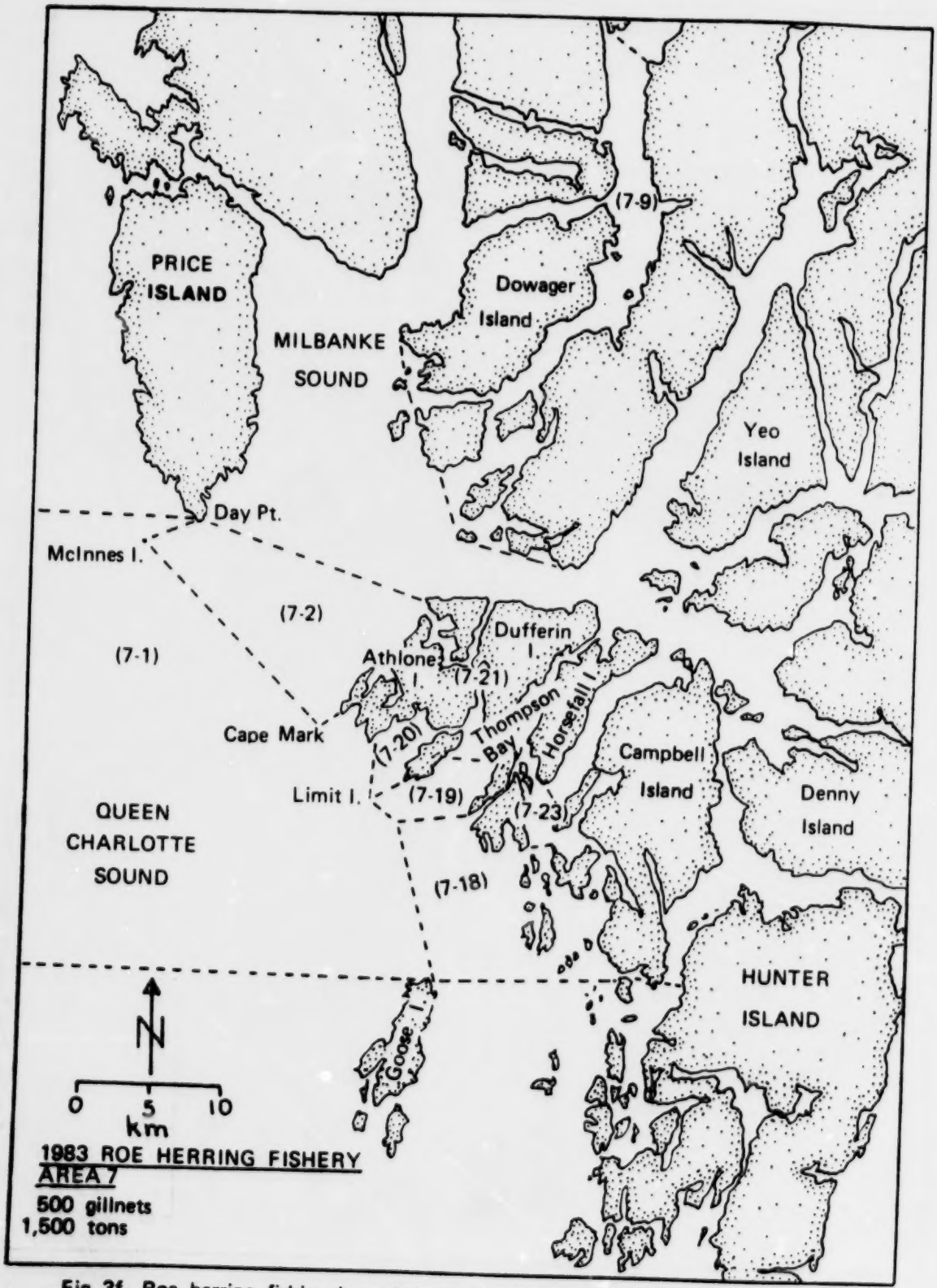

Fig. 3f. Roe herring fishing boundaries and hailed gillnet catches in Area 7, Cape Mark - Thompson Bay, 1983.

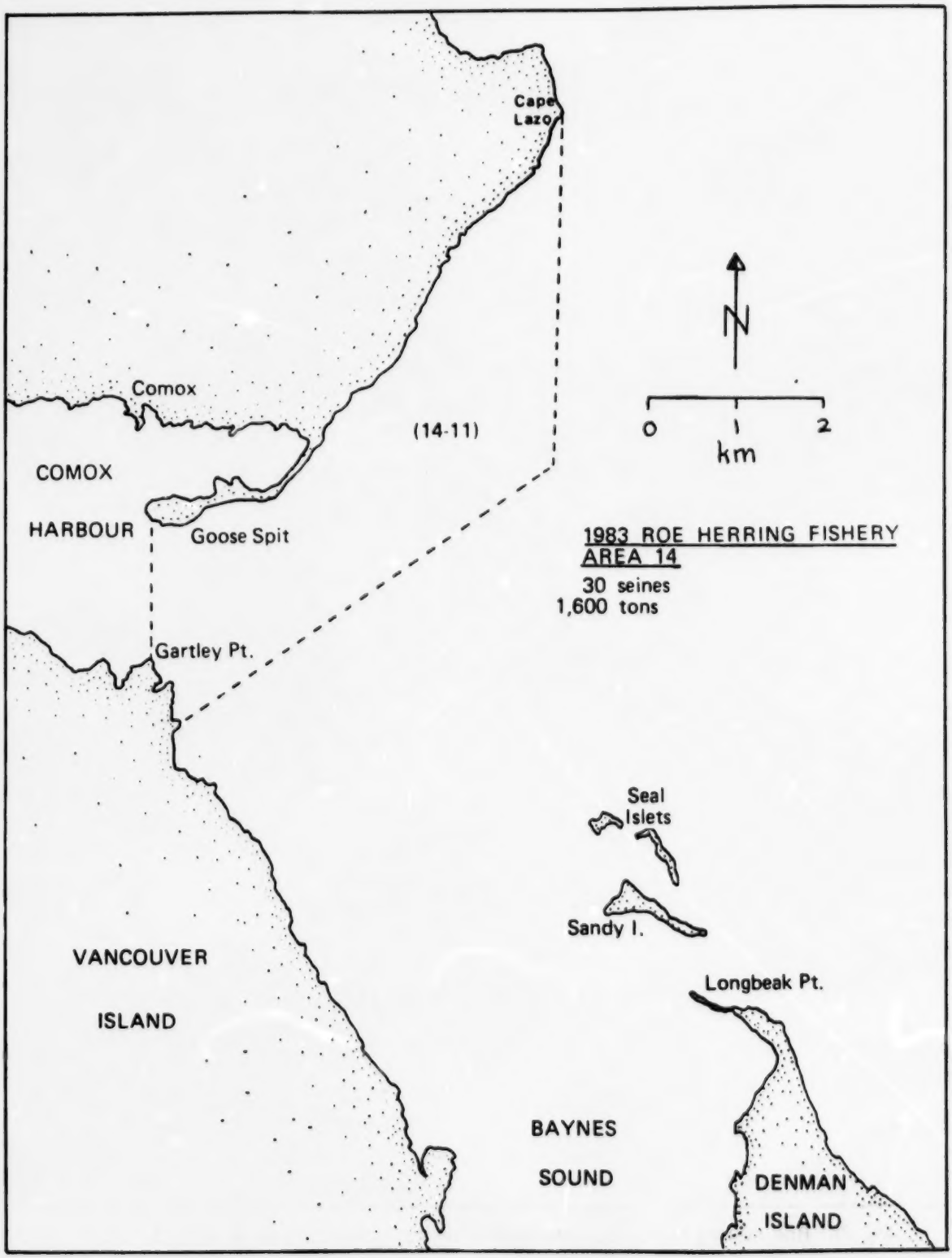

Fig. 3g. Roe herring fishing boundaries and hailed seine catches in Area 14, Comox - Cape Lazo, 1983.

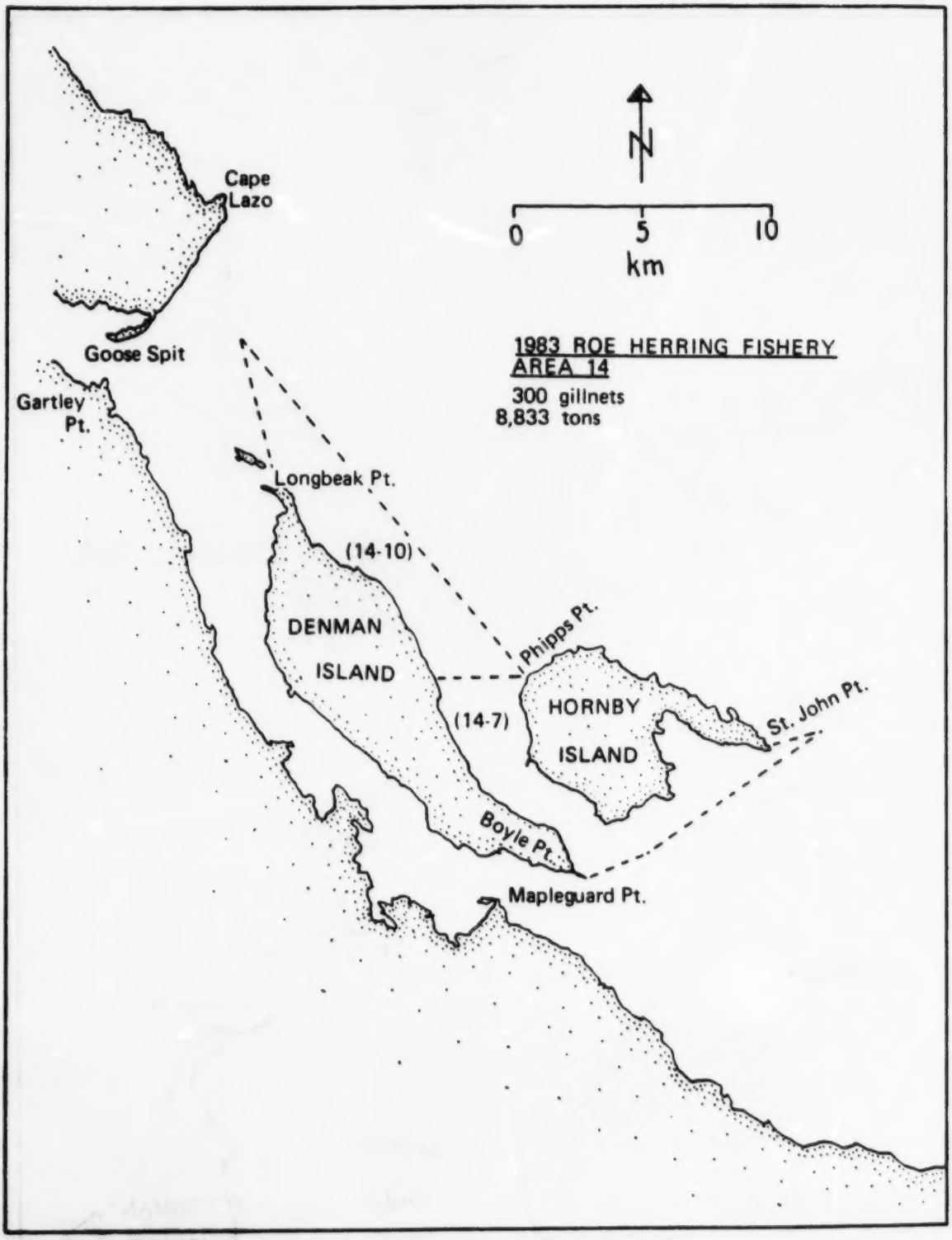

Fig. 3h. Roe herring fishing boundaries and hailed gillnet catches in Area 14, Hornby Island - Denman Island, 1983.

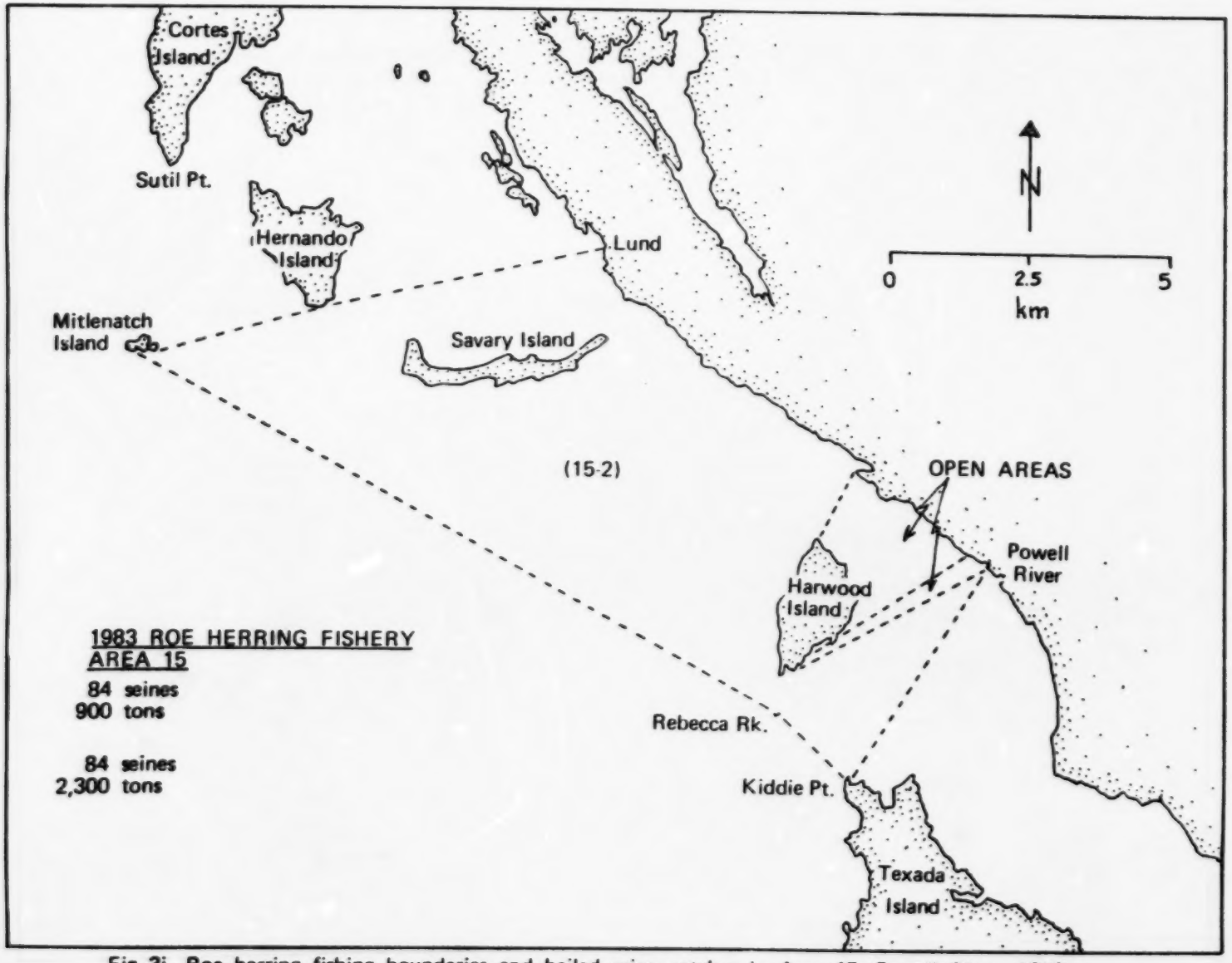

Fig. 3i. Roe herring fishing boundaries and hailed seine catches in Area 15, Powell River, 1983.

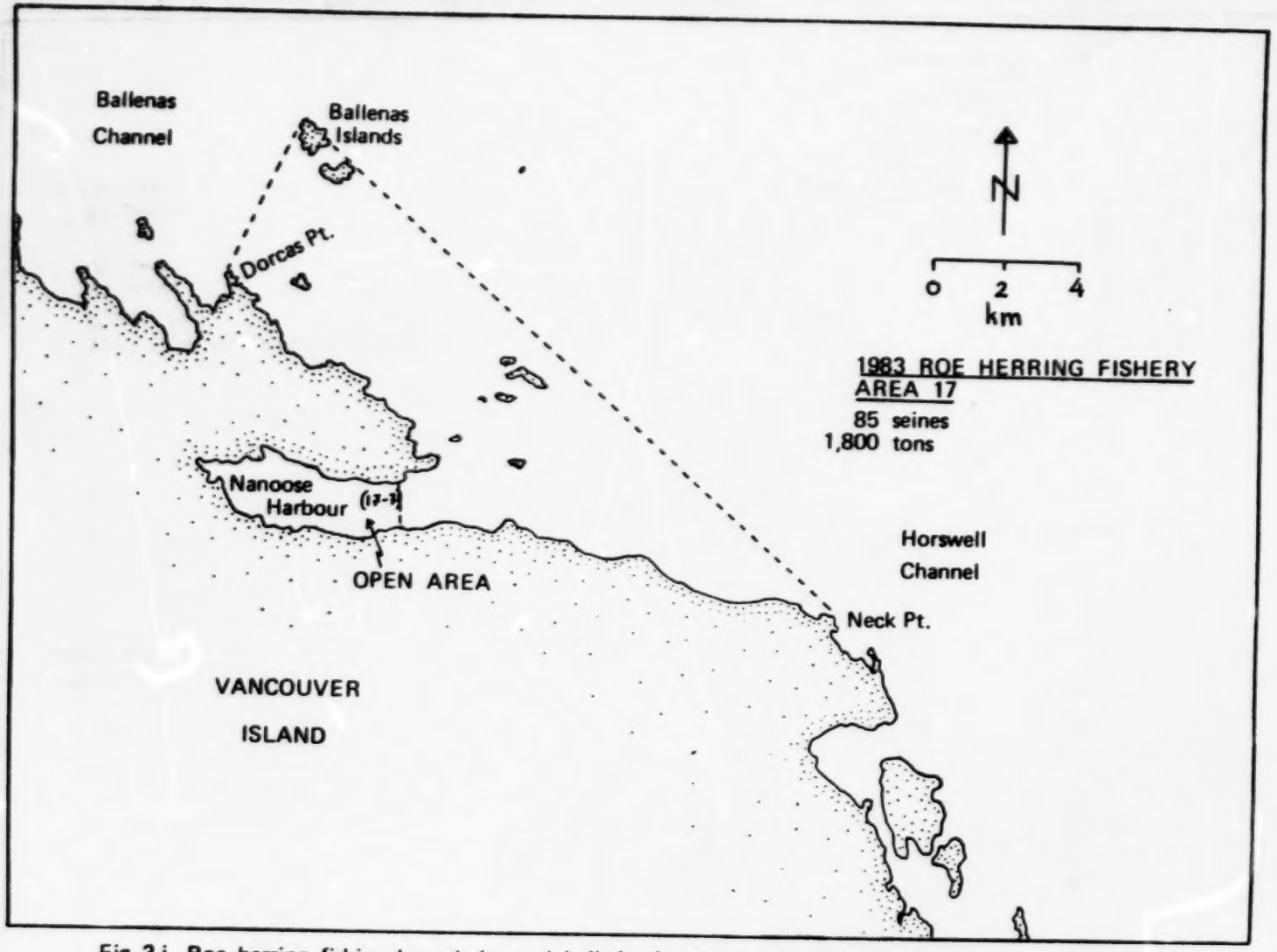

Fig. 3 j. Roe herring fishing boundaries and hailed seine catches in Area 17, Nanoose Bay, 1983.

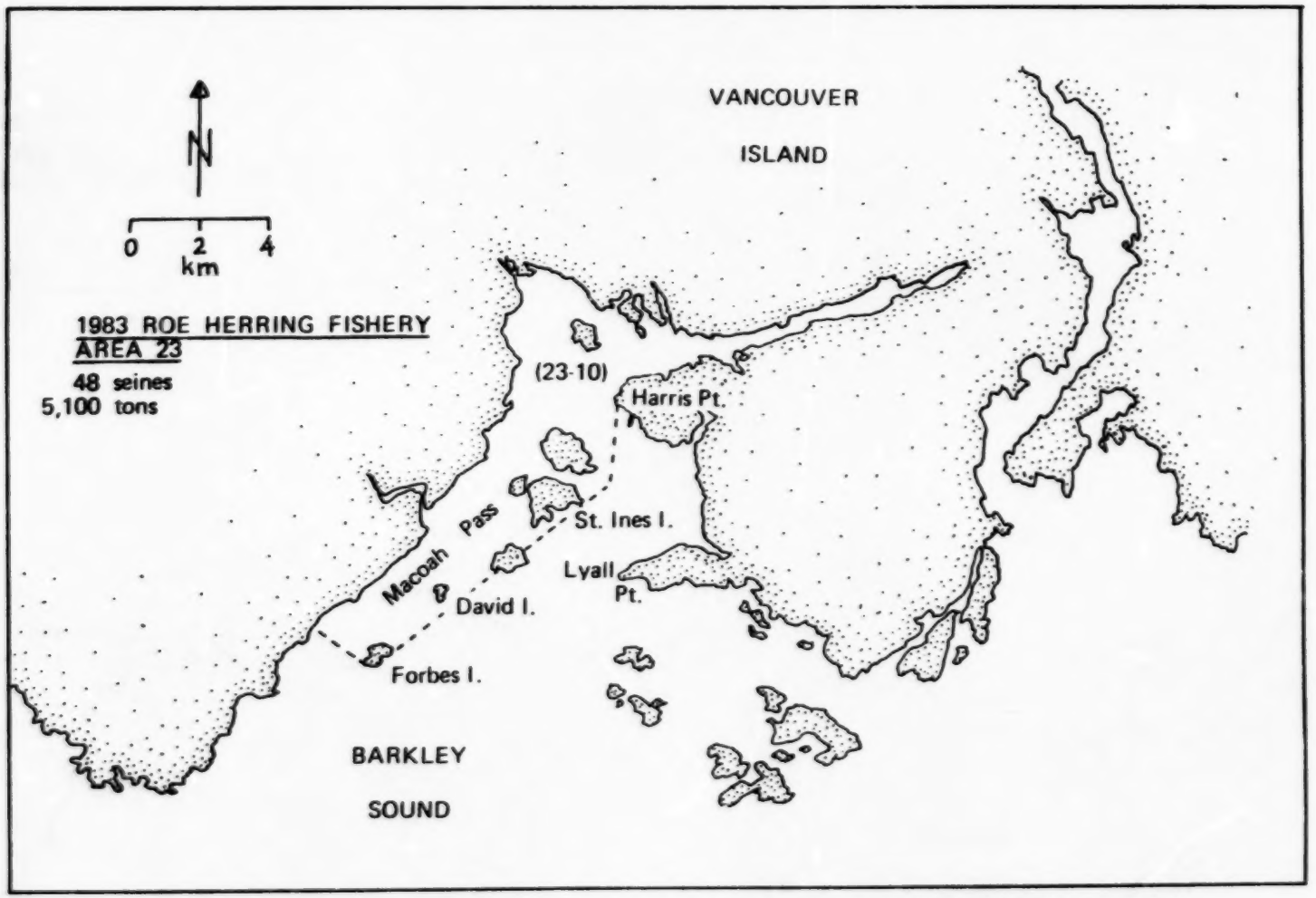

Fig. 3k. Roe herring fishing boundaries and hailed seine catches in Area 23, Barkley Sound, 1983.

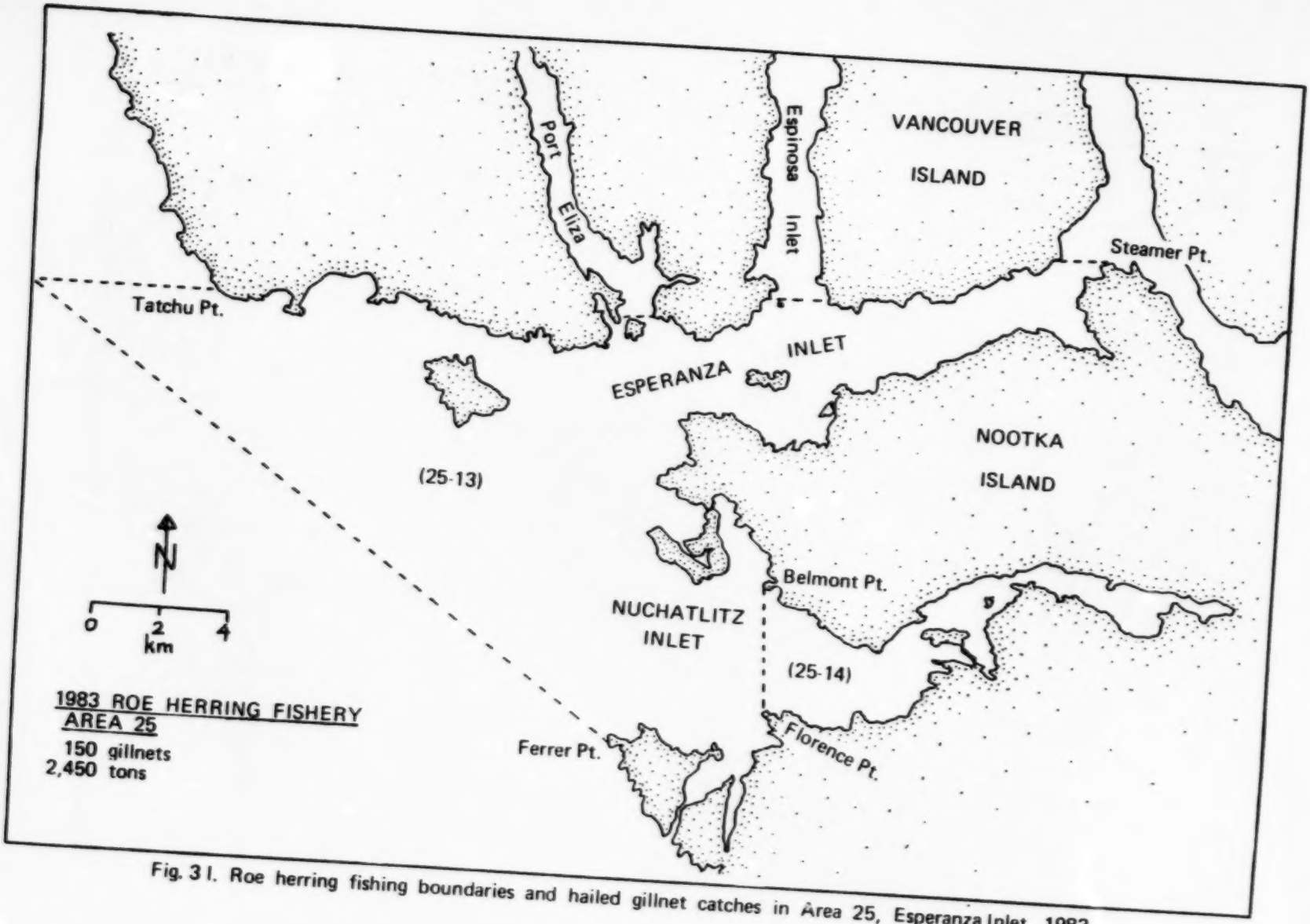

Fig. 31. Roe herring fishing boundaries and hailed gillnet catches in Area 25, Esperanza Inlet, 1983.

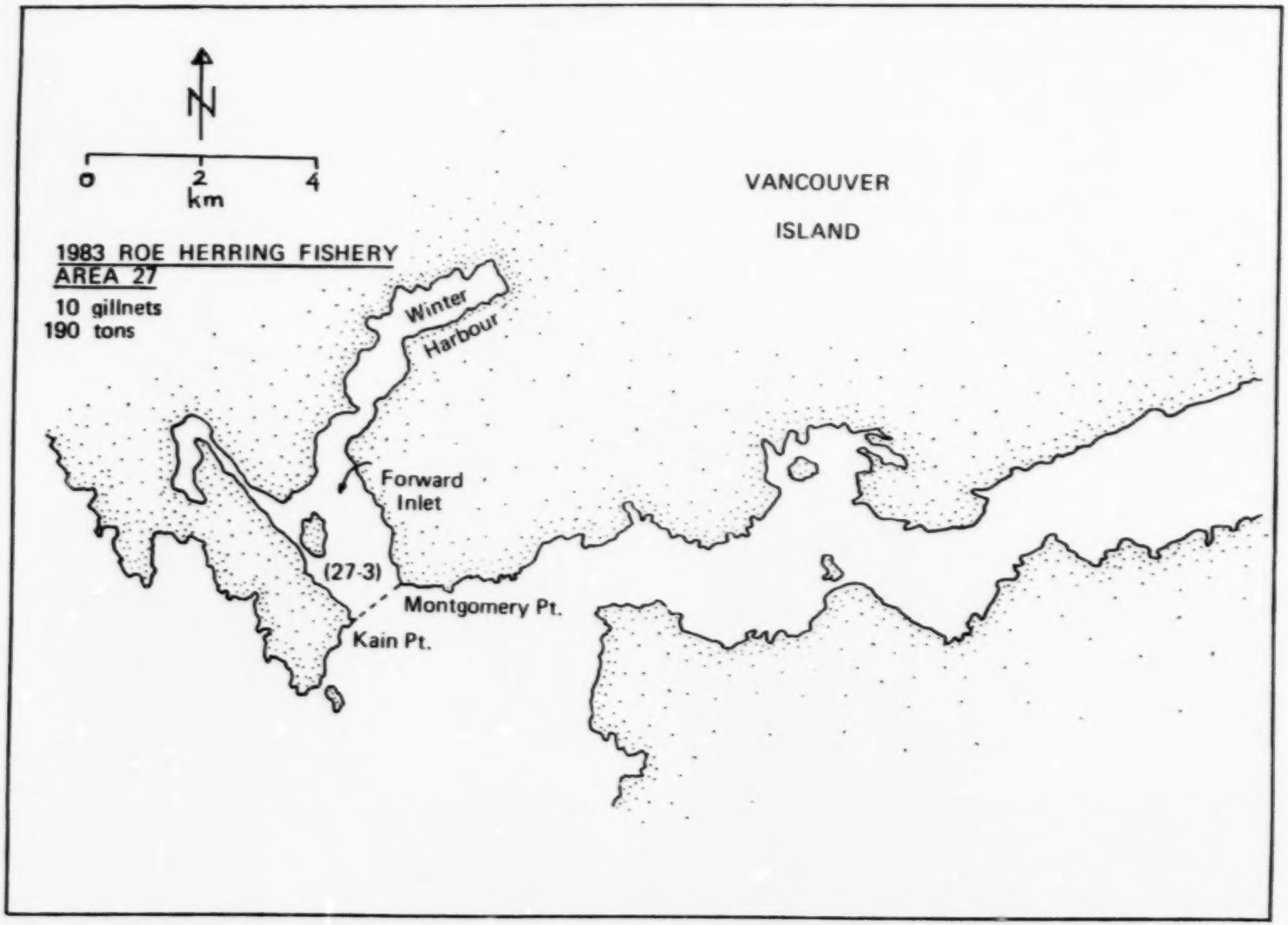

Fig. 3m. Roe herring fishing boundaries and hailed gillnet catches in Area 27, Winter Harbour, 1983.